# RELATIONSHIP BETWEEN ERGONOMICS FACTORS AND OCCUPATIONAL STRESS OUTCOMES AMONG AIRPORT STAFF AT KUALA LUMPUR INTERNATIONAL AIRPORT

**By**

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# ABSTRACT

Ergonomic is the major cause of stress among employees and this has set to become a vital factor that contributes to stress among employee especially in the aviation industry. However, creating awareness regarding ergonomic and occupational stress can help the organization to minimize and control the impact that it may bring to their employees and the organization cost.

This research examines the ergonomic factors such as body postures, health, work area design, working chair, humidity, lighting, working hours toward stress outcomes among the airport staff. These ergonomic factors help to identify the most prevalence factor and its relationship that effect occupational stress among airport staff.

Thus, in order to identify the contributing factors of this study, there are 6 types of methods used namely normality analysis, multicollinearity, reliability analysis, mean and standard deviation, person correlation and multiple regression. Data collected from 370 employees at Kuala Lumpur International Airport, Sepang, Selangor mainly working in the airside and landside division. The result shows that there is a relationship between the variables body posture, health, humidity, acoustic, lighting and working hours toward stress outcome. Two other variables work area design and working chair have no significant relationship with workplace stress.

In conclusion, the finding of this study suggests it is important to promote ergonomic concepts and practice. Ergonomic applications can be instilled in various industries so that both employers and employees' benefits can become aware of design concepts and work methods, this can help to improve workplace conditions as well as enhancing work occupational safety and health in the airport.

**Keyword:** Ergonomic, Occupational Stress, Somatic stress, Job Dissatisfaction, Intension to Quit

# ABSTRAK

Ergonomik adalah penyebab utama tekanan di kalangan pekerja dan ini telah menetapkan untuk menjadi faktor penting yang menyumbang kepada stres di kalangan pekerja terutamanya dalam industri penerbangan. Walau bagaimanapun, mewujudkan kesedaran berkenaan ergonomik dan tekanan pekerjaan boleh membantu organisasi untuk meminimumkan dan mengawal kesan yang boleh membawa kepada pekerja mereka dan kos organisasi.

Kajian ini mengkaji faktor ergonomik seperti rawatan badan, Kesihatan, rekabentuk kawasan kerja, kerusi kerja, kelembapan, pencahayaan, waktu bekerja ke arah hasil stres di kalangan kakitangan Lapangan Terbang. Faktor ergonomik ini membantu mengenal pasti faktor yang paling prevalens dan hubungannya yang mempengaruhi tekanan pekerjaan di kalangan kakitangan Lapangan Terbang.

Oleh itu, bagi mengenal pasti faktor penyumbang kajian ini, kaedah yang digunakan untuk kajian ini dibahagikan kepada 6 jenis kaedah iaitu analisis, multicollinearity, analisis kebolehpercayaan, min dan sisihan piawai, korelasi orang dan regresi berganda. Data yang dikumpul dari 370 pekerja di Lapangan Terbang Antarabangsa Kuala Lumpur, Sepang, Selangor terutamanya bekerja di bahagian Airside – betul dan landside. Hasilnya menunjukkan bahawa terdapat hubungan antara pembolehubah badan variabel, Kesihatan, kelembapan, akustik, pencahayaan dan waktu bekerja ke arah keputusan stres. Dua pembolehubah lain kerja kawasan Reka bentuk dan kerusi kerja tidak mempunyai hubungan yang signifikan dengan tekanan tempat kerja.

Kesimpulannya, dapatan kajian ini mencadangkan ia adalah penting untuk menggalakkan konsep dan amalan ergonomik. Aplikasi ergonomik boleh digunakan dalam pelbagai industri supaya kedua-dua majikan dan faedah pekerja dapat menyedari konsep reka bentuk dan kaedah kerja, ini boleh membantu untuk meningkatkan keadaan tempat kerja serta meningkatkan keselamatan pekerjaan dan Kesihatan di Lapangan Terbang.

**Kata kunci:** Ergonomik, Tekanan Pekerjaan, Tekanan Somatik, Ketidakpuas Bekerja, Niat untuk berhenti

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# CHAPTER 1

# INTRODUCTION

## 1.0 Introduction

This chapter presents brief information about the background of the study, problem statement, followed by research objective, research questions, scope of study, significant of the research finally explanation on definition of term and summary of the chapter that are used to discourse this research.

## 1.1 Background of the study

Stress is a part of everyday human life; however, this is not necessarily a negative phenomenon. In today's modern and challenging world, occupational stress has reached the level of harmful risk health among employees; this is due to excessive demands on job performance and lack of general well-being in various organizations. According to the World Health Organization (World Health Organization, 2013) occupational stress has become a critical issue. It is the response that workers may have due to job dissatisfaction, work demands and pressures when their employer gives a work task that unequal with their length of knowledge and specific abilities. This is agreed by Akanji (2002) stated that experts have always perceived occupational stress to happen between the physiological demands and the lack of competency on specific tasks that have pressurized employees to cope and adapt to the workload demands.

In customer-oriented fields organization especially in the airline industry that often encountering a conflict on job demand from their companies, supervisors, and customers may highly likely to develop stress (Campion, 2016). Asserted by Ajala, (2012) researchers have always seen stress among employees are negatively affecting employee workers in performing jobs efficiently and productively have increased turnover rates and costs within the organization. The World Health Organization (World Health Organization, 2013) asserted that depression would be the top disease and soon will outstrip cardiovascular disease among employees in the workforce. It was recently reported by STAR online Investing in the mental health of workers (2017) which has informed that by 2020 mental illness is the main concerning problem affecting Malaysian employees.

Ergonomic factor comprising the aspects of environmental stressor like humidity, noise, and lighting; work area design, working chair, and body posture. Research by Kress (2018) stated that ergonomic is the design within the workplace which includes the design of the equipment, instrument, machine and system application. Illness and hazard that related to ergonomic such cumulative trauma disorder CTD), low back pain (LBP), musculoskeletal disorder (MSDs), carpal tunnel syndrome (CTS), and other illness (Design, 2017).

The Aviation industry is segregated into two areas. The airside defined as a system of 3 components such as Run-aways, taxis-ways, and apron-gate areas. This group of workers includes pilots, flight attendants, flight engineers, ground handlers, ramp agents, baggage and cargo handlers and air traffic control. While landside is defined as the areas and operations within airport boundaries, exclusive of the airside, this group of workers is among ticket agents, customer service and crew schedulers coordinator, etc. (Hom and Orman, 1975). These groups of workers are often

exposed to ergonomic in their workplace, which can affect their health and psychosocial stress.

Therefore, from this study, it will seek to examine its association between ergonomic factors variable that contributes to stress outcomes among airport workers in Kuala Lumpur International airport.

## 1.2 Problem Statement

A positive stress in the workplace can encourage the worker to growth and development more in a wide range of tasks and activities within the workplace. On the contrary, the negative side of stress or strain may affect the employee health problem and risks in the long run (Campion, 2016). However, according to Kane *et al.,* (2015) an organization that builds its working culture base on mutual support and cooperation can create a stronger and productivity environment toward their employee wellbeing and health.



Occupational stress is defined as any uncomfortable situation that the employees faced when they are unable to cope to their work demands, because of stressful situations and lack of abilities within the workplace. Because of this reason occupational stress has become a worldwide phenomenon and among the most challenging issues in occupational safety and health. (Karimi and Alipour, 2011). According to Taneja, (2007) aviation sector is determined as a stressful place. The airport is an industry that operates 24 hours a day and 7 days a week, employees have to work shift hours and heavy work pressure environments, this making them expose to chronic fatigue due to work. This is agreed by Sun and Chiou (2011) stress at the workplace especially in the aviation industry has reached an alarming stage,

especially to the low levels workers such as customer service, ramp agents and baggage handlers.

Kuala Lumpur International Airport (KLIA) which operates on a 24 hours basis needs workers that able to monitor the airport operation to run well-ordered. Due to the rapid increase in the number of foreigner aircraft entering Malaysian airspace, there is a growing need for more employees to work in the airline industry (Malaysia Airport Holding Berhad, 2014). To fulfill this demand may cause the organization to pressure their workers to work overtime, this may lead to stress at the workplace and it will be a problem especially toward shift workers. Thus this can affect the health and wellbeing of the workers in the workplace (Demerouti et al., 2019).

Work-related stress is related to job demand, job position, career advancement, and colleague relationships between work, organizational structure and so forth (Cooper and Marshall, 1976). According to Ganster and Schaubroeck (1991), workplace stressors such as role conflict and obscurity, job overload, lack of power and repetitive work have led to outcomes such as job satisfaction, depression, quitting and somatic complain to name a few headaches, sleep problem and stomach upset.

Ground handlers had gained much attention last year 2017 stated by Malaysia Airports Holdings Berhad (MAHB) when more than 1,500 passengers were affected after 50 flights at Kuala Lumpur International Airport (KLIA) were delayed (Kannan, 2017). Nevertheless, According to the managing director Datuk Badlisham Ghazali (Kanyakumari, 2017), who stated that the baggage handling issues caused by a change in the work roaster of the ground crew and this had triggered them by protesting from coming to work.

The second issue is a complaint received from AirAsia passengers claimed that AirAsia ground baggage handlers were caught throwing passengers' luggage including a bicycle. The post also included a 30-second video that showed two ground handler unloading luggage from an AirAsia aircraft. According to CEO Tan Sri Fernandes (Fernando, 2018) who explained that the ground handler collaborates with a ground handling company Ground Team Red Sdn. Bhd. Furthermore, there is a possibility that the ground baggage handlers are suffering from body discomfort and pain, as stated by Bergsten (2017) that the ramp is situated around the aircraft, which is a factor to contend with and most ramp staff work up to12 hours a day. Ground baggage handlers are often involved in doing manual tasking such as loading passenger baggage, mail, and cargo into the aircraft. Hence, is often involved in kneeling or squatting, repeated handling or lifting heavy materials, and awkward body positions (Yang *et al.,* 2005). Consequently, ground baggage handlers are associated with several physical factors that lead to developing the risks for a musculoskeletal disorder (MSDs) as a result, has created unhealthy body posture among the ramp agents (Valachi and Valachi, 2003).

This incident happens recently with Malaysia Airlines (MAS) whereby the ground staff on the landside did not put luggage tagging and have kept the passenger waiting for 22 hours before departing for their flight. At the same time, the recovered luggage was also vandalized by the ground handler by writing insulting words upon the passenger's luggage (Neily, 2018). Regarding these reported incidents, it is not yet known either it is either the work attitude or lack of work responsibility that has affected the work performance of the ground handlers. According to Thye (2017) the Malaysian Employers Federation (MEF), Datuk Shamsuddin Bardan stated that workplace-related depression also is distressing with the continuously increasing

number of employee that is showing symptoms of depression in Malaysia According to Sun and Chiou (2011) investigation into occupational stress and work performance show that work stress can affect worker's psychology and may affect their job performance. Stress among the airport workers is increasing due to worker practicing unsafe working adequate and poor morale during work (Sun and Chiou, 2011).

Many works of literature have shown eight main dominant variables as the contributing ergonomic factors to occupational stress outcomes among airport staff. Those variables are body postures, health, adjustable chair, work area design, humidity, followed by acoustic, lighting and working hours. These variables indicate a significant correlation towards occupational stress outcomes (Makhbul, Z. M., Alam, S. S., Azmi, S. M., & Talib, N. A., 2011). However, all these studies have only been done in other industries. For example, Bergsten et al., (2017) has conducted a study among flight baggage handlers and found that daily shoulder pain and association with work tasks and upper arm postures is positively correlated to stress. As such the results of these studies may not be applicable in the Malaysian context due to differences in economic, social and cultural backgrounds.



Besides that, previous studies showed mixed and inconsistent results and lack of study in Malaysia for these eight variables so there is a need for further research to be done in the Malaysian context. Thus, this research is conducted in a Malaysian International Airport to study the factors that lead to occupational stress outcomes among airport staff using these eight variables.

## 1.3 Research Questions

Based on the problem statements that have been discussed above, this study intends to discover the answer of the questions as follow:

i. Is there any relationship between ergonomic factors, namely body postures, health, work area design, working chair, humidity, lighting, working hours and stress outcome among the airport staff?

ii. Is there any relationship between working hours and stress outcome among airport staff?

## 1.4 Research objectives

Based on the above research questions, this study intends to achieve specific research objectives:

i. To identify the relationship between ergonomic factors, namely body postures, health, work area design, working chair, humidity, lighting, working hours and stress outcome among the airport staff.

ii. To study the relationship between working hours and stress outcome among airport staff.

## 1.5 Scope of the Study

The scope of the study is to study the ergonomic factors such as body postures, health, adjustable chair, work area design, humidity, followed by acoustic, lighting and working hours in a Kuala Lumpur International Airport, Sepang Selangor. called KLIA for this study. These eight variables were chosen since they were the strongest factor causing occupational stress outcomes based on previous literatures

conducted in an airport in other countries. Sepang Selangor is chosen due to the airport location and its high population whereby its estimated population is 212,050 thousand in 2018. This study is limited to only the Malaysia Airport Berhad Holding that working in KLIA.

## 1.6 Significant of study

The Malaysian economy has continued to grow since the past years, and the resultant positive growth has opened many opportunities. With a vast number of passengers entering Malaysia, there is a concern that airport staff might expose to occupational stress and ergonomic while performing their job. The tourism industry is highly competitive in terms of handling passengers' luggage with cautiousness. Therefore, understanding the working pattern and posture of airport staff will help the company and other related organizations to reduce occupational injury among airport staff.

As for organization, this study will benefit the aviation industry particularly Human Resource Manager, Operations Manager and the Training and Development Manager. Having this knowledge, these top management can organize better strategies to minimize the ergonomic and occupational stress outcomes among their subordinates. Management and employees can discuss a better approach to reduce stress among workers. When the stress is minimized, the organization can provide quality customer service to clients which eventually can boost the image and increase profit for the organization. In addition, providing training on safety in the workplace and education on the ergonomic approach can minimize the exposure of injury and occupational stress among airport staff, this will contribute significantly to the development of the Airline industry.

Apart from contributing to the organization, this study may also be important to the Department of Occupational Safety and Health (DOSH) in Malaysia, since occupational stress is one of the occupational diseases. This study may give some information on the development of OSH activities in the country, especially in the airline industry. This study will help DOSH to formulate new strategies and improve the enforcement of OSH in the workplace.

## 1.7 Definition of terms

The terms that are discussed in this research are ergonomic factors and occupational stress outcomes. For that reason, the definition of the key terms as follows:

*Table 1.1: Definition of terms*

| Variable | Definition | Sources |
|---|---|---|
| Stress | Stress is the nonspecific response of the body to any demand. | Selye (1936) |
| Body postures | Prolonged standing in the workplace | Lafond (2009) |
| Health | A state of complete physical, mental and social well-being and not merely the absence of disease or infirmity | World Health Organization (WHO) |
| Work Area Design | The systematic organization, design and articulation of work activities at one or more levels. | Torraco (2005) |

| | | |
|---|---|---|
| Working Chair | A chair with adjustable seat height in which the height change, made to suit the size of a given occupant, will at the same time change the height of the backrest above the seat | Reineman and Carver (1989) |
| Acoustic / Noise | Noise is an unwanted sound | McKeown (2008) |
| Lighting | Anything that illuminates such as a lamp or candle. | Blonna (2005) |
| Working Hours | Amount of time spent by an individual to carry out a job or task | Brett (2003) |

## 1.8 Conclusion

This chapter presented the background of the study, research problem, research question, research objective, the scope of the study, significant of the study and definition of terminology.

The next chapter, in chapter 2 describes the literature review, which focused on the relationship between the ergonomic factors that might contribute to job stress outcome that affects the employees within the airline industry.

# CHAPTER 2

# LITERATURE REVIEW

## 2.0 Introductions

This literature review chapter is going to elaborate on the relationship between ergonomic factors and stress outcomes among airport workers. It goes to reveal how many researchers have stated how different ergonomic factors have led to job stress as well as examine different relationships between ergonomic factors and job stress. This section will look and understand the mechanism through which they affected each other.



## 2.1 Definition of stress

Stress is defined by Michie (2002) and Kamarulzaman *et al*., (2017) is referred to a situation when employee insufficiently has to face the external demands or pressures, and the workplace environment that may affect their physiologically and psychologically. Agreed by Slavich *et al.,* (2010) the employee will show the apparent symptom of stress in anxious, depressed, being angry and apathetic. Furthermore, this stress outcome can lead to a severe disease which includes stress-related diseases, low self-esteem, low quality of life and affected personal development. Furthermore, stated by Toussaint *et al*., (2016) if stress is not prevented as soon as possible in the long term it could lead to a severe lifetime physical and mental health problem to an individual.

The beginning of stress started from the brain cerebrum and went through to all of the body systems. Severe stress embodies a series of diseases that will affect the

human body system, for example, cardiovascular, autonomic, immune and metabolic systems. The problem of chronic stress may influence changes in personal behaviors and negative ways of life such as the urge to smoking, eating and drinking excessively and poor quality sleep (McEwen, 2007).

## 2.2 Definition of occupational stress

Occupational Stress levels at the workplace today have found to be profoundly critical than what was experienced by the past generation (Holman *et al.,* 2018). According to Stickle and Scott (2016), Occupational stress is defined as a psychosocial risk factor in the occupational field that can affect workers because work demands overcome worker's ability. Agreed by Mohajan (2012) occupational stress has been shown a collective knowledge that signifying the perilous physical and emotional reactions toward an employee that in a workplace are pressures and demand by employers to exceed their capabilities to meet job expectations.



In recent years there has been considered a growing number of studies have found that occupational stress in the working world has grown at an alarming stage since 40 years ago (Azida and Kamarulzaman, 2015). Besides, the researcher Kamarulzaman *et al.,* (2017) also stated that stress at workplaces, slightest pressure could help to stimulate the working motivation among workers that eventually increase the job performance. However, a continued high level of stress may well affect the worker‘s productivity, increase in absenteeism, low productivity, turnover and related diseases are among destructive impacts found by researchers in related with occupational stress.

The equations are given comprehensively in the Occupational Safety and Health Act 1994; section 4 stated its objectives to promote a professional environment that is altered to a person's physiological and psychological needs. Furthermore, stated in section 15 stated that every company needs to be responsible for providing a safe work environment and an efficient work system to minimize the work hazard to workers. Besides, the employer has to practice a control measure to minimize psychosocial stress in the workplace. Thus taking care of their worker wellbeing and workplace environment may decrease the occupational stressor among the workers.

### 2.2.1 Somatic Stress

Study on stress was carried out by Jetha *et al.,* (2017) who researched and described how work stress might have an impact on individuals and organizations. The researchers have categorized the sources of occupational stress as essential to the job, role in the organization, relationships at work, career development, organizational structure and climate, and homework interface. This is agreed by Bongers *et al.,* (2002); Hauke *et al.,* (2011) who stated that workers that working in negative environment is exposed to psychosocial factors at work encompassed of pressure work demands, lack of job control and no social support hence, this factor lead to work-related diseases such as shoulder pain and low back pain. Supported by Evans and Johnson (2000) stated that psychosocial stressors related to stressful working conditions that including lack of control and empowerment, long work hours, shift work, interpersonal conflicts, insufficient resources, poor reward systems, the inadequate structure of communication flow which lead to workplace bullying and physical violence.

According to Loveday (2012), stress is considered a slight problem in the workplace and is often neglected. An investigation into stress, the researcher shows that work stress is a negative emotional and physiological state that employees suffer from when faced with challenging work conditions that are beyond their control. Besides, this is also because of the negative worker perception toward their working environment and eventually encourages to job quitting.

In a significant advance Bagshaw *et al.,* (2019) surveyed Stress within the airline industry, in the analysis showed that workers stress in the workplace can be caused by environmental conditions, provocations, and events, which are referred to as stressors. Other than that inappropriate physical infrastructure such as lack of lighting; unsuitable humidity system; work area design; and acoustics systems may also stress elements that can affect worker productivity. As stated by Makhbul *et al.,* (2013), the experience of stress among employees in the workplace are concerning issues that affect both the health and safety of individuals and the well-being of their organisations. Furthermore, the authors studied that work stress can affect workers in various ways; worker may get illnesses and depriving sleep or may interfering with concentration during the working hour which can lead to more injuries and accidents occurrence.



### 2.2.2 Job Satisfaction

Job satisfaction indicated as being challenging to today world as an employer need to think a way to satisfy their employees to cope with very changing of the environment in order to strive excellent ( Raziq and Maulabakhsh, 2015). According to Rast and Tourani (2012) stated that when workers are not satisfied with the work duty

assigned, no work remuneration, lack of abilities and experiences can discourage them to be committed to work. Other than that, a worker that does not have specific roles, low social recognition, and interpersonal communication can be the potential lead of job dissatisfaction and stress.

The employer that appreciates on their employee wellbeing must make it balance between work and welfare in order to make them satisfied. By empowering the employee through job financial remuneration, upgrading working position and security that may fulfil their need for social recognition (Chen, 2006). According to Petty, Brewer and Brown (2005) employee will leave their job position or company because of job satisfaction. Following the levels in Maslow‘s hierarchy, employees will be satisfied if the levels were achieved. The researcher stated that if the employee is not satisfied with his needs on a higher level, the employee will return to the needs of a lower level that have already been achieved.

Studies have been published by Olivier and Rothmann (2007) they explained that being engaged in one‘s work role leads to fulfilment and contributes to personal well-being. The researcher argued that even though the main focus is often on the company's well-being, work engagement focuses on the individual commitment itself. Nevertheless, Employees might be more likely involved at work to the extent that they attach a more significant amount of rewards and recognition for their role performances. Besides Job, satisfaction is a work-related research topic in the field of organisational psychology, organisational behaviour and the industrial area (Spector, 1997). The researcher also mentions that the working environment is considered as the most important factor in job satisfaction while the work environment is the predictor of employee job satisfaction in the organisation setting.

### 2.2.3 Intention to Quit

From the research of Sims *et al.,* (2016) workplace design has been identified as stress instigating, which leads to job dissatisfaction, complaints on the working environment and intention to quit among workers. Employee turnover is a critical issue; this current trend of employee leaving the company or the company firing the employee have increasingly alarming (Saeed *et al.,* 2014). De Plooy found an increase in turnover intention and Gert (2010) stated that intention is a type of withdrawal behaviour that is related to under-identification with work. They further emphasise that turnover or intention to quit is the conscious and willing to leave the organisation and it is regarded as the last in order of withdrawal cognitions. Some preliminary work was carried out by Werbel and Bedeian (1989) stated that age, gender, tenure, educational qualifications, and marital status was the factor that associated with intention to quit.

Tuzun and Kalemci (2012) underline that intention to quit is a good conjecturer of actual turnover, consequently making it indispensable for organisations to investigate and understand the reasons behind the turnover intention and how to control or minimise them. Therefore, the researcher affirmed that stress is the main motives that have intended the employees to quit their job. Employee experience of job stress and the range factors that lead them to job-related stress make employees want to quitting (Ongori, 2007).

## 2.3 Ergonomic Factors

The Safety and Health Department stated that ergonomic that occur in the occupation have led to many hazards, especially in the airline industry. Airport workplace ergonomic health hazards may be categorised as Visual, Musculoskeletal, and Stress. A study done by (Kress, 2018) stated that ergonomic are comprising not only on the design of workplace but it also involves in ergonomic types of equipment, machine, tool, product, and system. Through great concern on the employee's physical, psychological, biomechanical, psychological capabilities, may enhance the effectiveness and productivity of work systems, eventually increase the safety measure the employee safety, health, and wellbeing of the worker's stress level.

Ghosh *et al.,* (2011) opined the purpose of ergonomics is to maximise the design concept in the workplace so that it will be fit through the needs and physical capabilities of employees thus can protect the employee from physical impairment during working hours. Furthermore, the researcher added that a poorly designed working environment could slow down the productivity and performance of employees that eventually lead to job dissatisfaction and high turnover employment. Some preliminary work was carried out and agreed by Tarcan (2004) and Graves (1998) that ergonomics associate between humans, machines systems, job design, and the working environment. Through an ergonomically designed workstation company can apply it by minimising work stress.

In the airline industry, the employees that divide various divisions of different tasks have played a significant role to make sure it fulfils the standard operation obligations to assist their guests efficiently. According to AirAsia Berhad, to reduce the ergonomic issue among the check-in counter worker, they implementing the hi-

tech in their establishment as they strive to move with the pace of technology, for instance, the AirAsia Berhad have introducing the E-Boarding Pass which is a paperless boarding pass which allows guest to clear airport security or immigration before board a flight. Passenger can use their mobile and download the AirAsia mobile application to check-in and do a label tagging own their luggage afterwards passengers carry their luggage to the drop beg counter.

Korkmaz (2005) claimed that airline industry workers face critical injuries associated with overexertion, repetitive lifting, and awkward postures, especially among ground baggage handlers in the airside section. According to Shikdar and Sawaqed (2003) employee that using a computer have the risk of musculoskeletal injury cause of the prolonged sitting. While author Shahraki and Nooh (2011) justified that if a company fails to apply ergonomic values at the workplace, this can influence employee emotional depression, physical exhaustion, and declining productivity and products quality. Therefore, It has been suggested by Ahasan and Imbeau (2003); Shikdar and Sawaqed (2003); Zafir and Fazilah (2007) that ergonomics factors can significantly impact employee safety and health, this seems to be reliable with great attention and consideration is given to ergonomics when designing the work environments.



### 2.3.1 Body posture

An initial study in this field, according to Lafond *et al.,* (2009) focused primarily on body posture and prolonged standing in the workplace has been associated with work-related musculoskeletal disorders and lower back pain. Ansari *et al.,* (2013) reported on the study of body postures among workers found that prolonged working in the same body postures leads to musculoskeletal disorders. It is observed by Shikdar and Sawaqed *et al.,* (2003) that consistent variation between sittings,

standing and walking in between working hours may prevent low back injury musculoskeletal disorders.

A recent review of the literature on this topic by Hallman *et al.,* (2016) found that work biomechanical exposures and pain have been recognized as repetitive movements, this has led to being risk factors for developing pain especially with elevated upper arms or above shoulder level. Asserted by Bergsten *et al.,* (2017) found that a daily increase in shoulder pain among aircraft handled. The researcher claimed that biomechanical exposures are mostly in extreme shoulder postures, neutral shoulder postures and psychosocial stress factors associated with the causes of ergonomics at work.

According to Harkness *et al.,* (2003) that the aircraft baggage compartment space has been identified as constricted and the ceiling height is only about 1meter. For instance, aircraft Boeing 737-800 which widely used by commercial aeroplanes worldwide have indicated that the baggage handler to need does lifting in awkward positions while transferring guest luggage this movement are involving of are kneeling, stooped and sitting position. (Bulduk *et al.,* 2017) describe accurately when baggage handler is lifting with one or two hands (10 kg), lifting at or above shoulder level (9 kg), and pushing/pulling (32 kg); working with hands above shoulder and monotonous work, and any other body part pain, may cause the prevalence to cause injury. For instance by pushing baggage from the doorway into the baggage compartment of narrow-body aircraft‘‘ and stacking baggage inside the baggage compartment of narrow-body aircraft (Korkmaz, 2005).

### 2.3.2 Health factor

Health is categorised by five-dimensional these are such emotional (mental) health, physical health, social health, spiritual health and mental health (Tetrick and Winslow,2015). The author explains that physical health refers to the physiological condition of the body, which impacts the body on the health of smoking, physical activity, alcohol, and nutrition. While emotional health refers to one mental state of a human being, this consists of stresses in individual personal life, the reaction to stress and the ability to relaxation by devote time to leisure, where it can be exposed to disease and unhealthy lifestyle practice. Meanwhile, social health is the ability to get along with others, including family members, friends, professional colleagues, and neighbour. This is very important in helping recovery and rehabilitation from disease, reducing the impact of stress, lowering disease and mortality rates.

Spiritual health is the condition of one spirit, including having a sense of purpose in life, the ability to give and receive love and feeling charity and goodwill toward others. While Intellectual health is related to achievements in life, which occur through work, school, community, hobbies or cultural pursuits, it also manifests its impact on overall health through the relationship between education and healthy lifestyle practice, unemployment and disease, socioeconomic status, medical care utilisation and health practices (Tetrick and Winslow, 2015).

World Health Organization (WHO) also affirmed that a negative working environment might lead to physical and mental health problems, harmful use of substances or alcohol, absenteeism and lost productivity. However, workplaces that promote mental health and support people with mental disorders are more likely to reduce absenteeism, increase productivity and benefit from associated economic gains.

According to Cooper and Williams (1991), blue-collar workers have more potential to get exposed by health risk compared to white-collar workers, because of the nature of the job the blue-collar workers are exposed to the rough workplace, dusty work environment, psychological work stress and ergonomics problem Liang and Xiang ( 2004). Besides that, they are also exposed to noise, air pollution, physical burden, and unsatisfactory shift work, long working period, weak social interaction and bad relationships with the superiors (McLean, 1974).

Job demand defined as psychological stressors, especially in an industry that required the workers to work fast and hard, not having enough time and having conflicting demands. Thus a fast and hectic workplace may impose a physical requirement that leads to fatigue by the industry also may pressure and increase stress levels among the workers.



### 2.3.3 Adjustable working chair

Appropriate chair in the workplace allows the employee lower back to be comfortably supported and a correct back posture to be sustained especially when the employee is seated at computer workstation (Grove, 2017). According to Human Factors and Ergonomics Society of Australia suggested that employee needs to adjust their chair before starting doing their work, these central elements that vitally need to be adjusted before sit down at a workstation are the chairs, keyboard, mouse, monitor, document holders, and placement of equipment on the desk. Ergonomic chairs and comfortable work area could minimise work stress (Sutton and Rafaeli 1987; O'Neill, 1999). Further, the provision of control over the work environment through adjustability and knowledge may enhance worker effectiveness as well as health (Robertson and Huang, 2008).

### 2.3.4 Workstation area design

Workstation designs significantly affect working body posture that led to physical symptoms (Khan *et al.* 2005). Few researchers (Řasa and Plos, 2015) have addressed the issue of work posture such as sitting, standing or bending, twisting, carry and lifting which has been known as one of the most important factors when designing appropriate workstation design (Ikonne, 2014). It has been observed by Office Ergonomics Handbook (2008) that poor chairs and or bad postures can cause lower back strain, and a chair that is too high can cause circulation loss in legs and feet, one style of the chair may not be suitable for every worker. In the review of the process of designing a workstation, Yeow *et al.,* (2003); Mohamad *et al.,* (2005) asserted the need for several factors especially ergonomic factors must be taken into consideration. Ignoring the ergonomic codes may lead to depression, physical exhaustive, lack of productivity and product quality declining (Shikdar *et al.,* 2003).

The organisation that does not apply the suitable work design are exposing to hazard elements in the workstation. Risk factors related to rapid work pace, excessive workload, insecure job, and lack of control and overwork can contribute to the development of repetitive work motion and health symptoms. Examples of this symptom such as anxiousness, irritability, high blood pressure, ulcers, and headaches can be caused by poor work organisation or job design (CWA Safety and Health Department, NYCOSH, 2014).

More recent evidence by Makhbul and Senik (2013) suggested that job that operated by human person in regards to body posture and health, it is essential to consider ergonomic aspect when it comes to designing an appropriate workstation design, for instance, machinery need to be appropriate equipment and be often maintain; comfortable work area, comfortable working chair and work area design; and other

factors such as humidity, acoustics, lighting, shift work and working hours. According to Robertson *et al., (*2013), workplace design has influence and led to injuries at the workplace occurred because of unsuitable tools and equipment used by employees in performing their tasks. Asserted by Croon *et al.,* (2005) the researcher has identified that installing non-ergonomic workstation design may affect directly and indirectly the employee's physiological and psychological reactions, which may increase the stress level, fatigue, and low job contentment.

### 2.3.5 Humidity

Workstation environment is one of the main reasons that are associated with stress at the workplace, and it is categorized by extreme heat, dim lighting, and congested works area Sutton and Rafaeli *et al.,* (1987). An excellent indoor thermal characteristics quality such as air temperature, air movement will improve product quality and help to minimise the outcome of work stress (Design, 2017). Agreed by Clark (2002) the researchers have always considered the workstation environment as crucial factors that influence worker stress in the working environment, and this involves extreme heat in the workplace creates mental depression and affects work performance. Stated by He *et al.,* (2017) discomfort from the extreme work station environment has urged the employees to complain about a better working environment nevertheless, companies that are not willing to improve the working environment may lead to employee job dissatisfaction.

### 2.3.6 Acoustics

Noise hazard is considered as one of the everyday stressors in the workplace, which is more prevalent in stress issues among blue-collar workers (Melamed *et al.,* 1992; Leather *et al.,* 2003). According to Goines and Hagler (2007), noise pollution is an unwanted audible sound that can threaten to people health. The airline industry is one of the working settings where noise pollution is unavoidable according to Ozcan and Nemlioglu (2006) was did a study on the noise on Airbus A321 aircraft in which the researcher described the levels of 60-65 decibels (dBA) before takeoff; 80-85 dBA during flight; and 75-80 dBA during landing. The outside of the aircraft engines experiences around 140 dB at take-off and conditions on other aircraft may have higher or lower noise levels. The researcher also asserted that the sounds produced not only make the work environment more stressful but can, over time, cause ear discomfort, eardrum rupture, and permanent hearing impairment.

Unwanted noise or sound from the telephone ringing, piped-in background music, loud telephone conversations, and typewriters affects the ability of employees and persistent occupational health problems (Nadiah, 2016). In aviation environment according to Antuñano (2006), the aviation are categorized by many bases of noise, noise is produced by aircraft equipment power plants, transmission systems, jet efflux, propellers, rotors, hydraulic and electrical actuators, cabin conditioning and pressurization systems, cockpit advisory and alert systems, communications equipment, etc are the common noise that can be heard in airport environment. Likewise, the noise can also be caused by the aerodynamic interaction between ambient air and the surface of the aircraft fuselage, wings, control surfaces, and landing gear.

Affirmed by Evans and Johnson (2000) conduct studies on how the existence of noise as stressor contribute to employee level of distraction and disturbance during work and demotivating effect in the workplace This also agreed by Antuñano (2006) who stated that noise is one of the causes of employee‘s distraction which causes reduced productivity and may cause adverse health effect on the employee.

### 2.3.7 Lighting

There is a vast amount of literature on how appropriate and adequate lighting plays an essential role in minimising work stress (Rafaeli *et al.,* 1987). Aaras et al. support the finding*.,* (2001) stated that Lighting is divided into three concerned within airport work are such illumination, luminance, and reflectance. Leather *et al.,* (2003) who suggested that high levels of glare and minimum lighting in the workplace can affect eye strain and lead to stress in the workplace. Wojecikiewicz (2003) indicated that as insufficient lighting at the workplace can affect job stress while good lighting may contribute to the increase in workers‘ productivity and capability which can help minimalise fatigue. Supported by (Mathews and Khann, 2016) stated that excessive light and insufficient lighting might constrain the employees to perform work effectively. The more rapid, repetitive, and lengthy the task, the more critical it is to have enough light. With these types of tasks, the eye is more vulnerable to fatigue and the worker to declining productivity.

A large number of work environment studies have shown that workers/users are satisfied concerning specific workspace features. These features preference by users are highly significant to their productivity and workspace satisfaction; they are lighting, ventilation rates, access to natural light and acoustic environment (Vischer,

2008). Lighting and other factors like ergonomic furniture have been found to have a positive influence on employee‘s health consequently on productivity (Dilani, 2004; Milton *et al.,* 2000).

In a study by Larsen *et al.,* (1998); Veitch and Gifford, (1996) ambient features in office environments such as lighting, temperature, glazed of windows, and free air movement, were described as elements of the physical environment which influences employee‘s attitudes, behaviours, satisfaction, performance, and productivity. Al-Omari and Okasheh (2017) affirm the importance of natural light and air ventilation to worker productivity, a sufficient daylighting system inside the building will increase productivity among employees. Chandraseker (2011) underlines that unsafe and unhealthy work environment is a reflection of poor ventilation; inadequate lighting and excessive noise are prevalence to affect workers‘ efficiency and health.



## 2.4 Working hours

Airline industry operated for 24 hours, which the employee opts to work on shift bases various time structures of employees that working base on shift may affect the physical, and psychosocial of employee wellbeing and health (Tzischinsky, 2018). Kundi (2003) did a study concerning places where the work environment is using a shift work system which has been identified as a stressor. The research of Costa (2003) has also been widely studied notably employee that working in the shift system may get insomnia, difficulties in the digestive system and mental health are prevalence to stress.

Several scholars such as (Iacovides *et al.,* 2003; Savery *et al.,* Luks, 2000; Ahasan, 2002 and Tucker, 2003) found out that long working hours can cause acute stress in

the workplace and extreme fatigue, long working hours and insufficient rest can lead to stress thus increase the accident rate in workplace. Some preliminary work was carried out several years ago by Plooy and Rood (2010) who stated that lack of staff in charge, unstructured shift work and frequent overtimes with long working hours and lack of rest might contribute to the occurrence of low back pain.

International Labour Organization (ILO) stated that the rest periods are important, particularly in occupations that require a fast pace of work or a high degree of vigilance. When the employees are highly interdependent, a clear directive on work timing and duration of rest periods is advisable by preserving and improving worker‘s health and wellbeing. Besides, the International Labour Organization (ILO) shows there working on shift have a total of 40 hours in a week limit. However, in the global workforce, or 614.2 million workers, are working more than 48 hours per week. Meanwhile, in Malaysia, employees total working time in a week is 48 hours, with a maximum of 8 working hours per day and six working days per week (Malaysian Employment Act Section 60 (A1), 1955).



## 2.5 Occupational Health and Safety Legislation

Stated in occupational Safety and Health Act (OSHA) of 1994 provision, Section 15 and 17 determined employers must provide and obligate to practice a safe working environment, well maintained, safe equipment, and safe systems of work, for the well-being of their employees‘ health care and visitors or contractors as well to the patients. Provision under Section 16 of the same OSHA 1994, the safety and health policy statement should clarify the policy, standardise safety and provide supports for implementation of safety and health within the organisation. In regard with the

function of Safety and Health Committee was obtained from under Section 30 and 31 of OSHA 1994, stated that the management committee must commence playing an active and proactive role to continuousness take action for preventive and risk assessment measures, it has to be coordinated, documented, harmonised and implemented. Besides, Section 24 of OSHA 1994 also predetermined that all employees must comply and remain with the policies and protocols placed for their safety by their employers, for instance, employees must protect their health and safety by using personal protective equipment provided to them. There is also general agreement on worker protection provision by Occupational Safety and Health Administration (OSHA) of United States of America; they stated that the ergonomics is science of fitting the physical environment and the job to the employees have limitation and different capabilities when performing task ergonomics as science of fitting the physical environment and the job to the worker‘s capabilities and limitations as well as to the tasks performed (Muhammad, 2004).



Findings regarding work-related low back pain have led to when there is a change between environment, employee and duty. Section 20 and 21 of OSHA 1994, in general, the duty section states that employers who are conscious of the possible hazards at the workplace must make employees aware of these risks and exert to eliminate them. Hannibal and Bishop (2014) claimed company that force employee to work in a poor ergonomic designed workplace or job structured eventually they will adapt and adjust their body to it yet in a long term may cause pain, the body‘s coping mechanisms, causing the physical body symptoms, emotional stress, low productivity, and poor quality. As asserted by Menzel *et al.,*(2007) the employees are not receiving similar protections is because to a singular focus on earning wages, not

given proper training and lack of occupational health and safety regulations in the workplace.

### 2.5.1 Occupational safety and health in Malaysia

Occupational safety, health, and environmental management have been widely studied and can be divided into two parts. The first part is the occupational safety, health and environmental management through non-legislative approaches and the second part is the occupational safety, health, and environmental management through legal means (Jamaluddin 1993; Kadir and Jamaluddin 2002).

A neglected area in the field of protecting each employee‘s rights and interests on the safety, health, and environment at the workplace is often neglected, the law of negligence in the area of occupational safety, health and environmental management is significantly essential at the workplace. Occupational safety and health in Malaysia are divided into few sections following the exposures to hazard in the workplace. To name a few the Factories and Machinery Act (FMA), 1967 and the Occupational Safety and Health Act (OSHA) enacted in 1994 with OSHA 1994. This philosophy of legislating safety and health in the workplace is prescriptive and containing detailed technical provisions under FMA, FMA 1967 is emphasising on safety. In contrast, OSHA 1994 is an emphasis on addressing health hazards in the workplace.

These regulations are developed by the Department of Occupational Safety and Health (DOSH) with multilateral and selected consultations. Through the support from the various ministry, National Institute for Occupational Safety and Health (NIOSH) and other related agencies, has established compact regulations and set

occupational exposure limits (OEL) for these workplace hazards, this regulation is validated in Malaysia within the order of Act, regulations, industry code of practice and guidelines.

### 2.5.2 Statistics of industrial accidents in Malaysia

In Malaysia, the Department of Occupational Safety and Health (DOSH) under the Ministry of Human Resource is responsible for enforcing the law on occupational safety and health, which was introduced in 1994. According to the department of occupational safety and health (DOSH) from 2018, the total accident reported was 5031. The highest accident occurrence is within the manufacturing industry about 3228 accidents reported. Followed by agriculture, forestry and fishery with 749 reported accidents, lastly from construction industry 232. Another industry such as finance, insurance, real estate, and business services report accidents is 217. Follow by utilities 173, transport, storage and communication have 137 accidents. One hundred twenty-three accidents report from the hotel and restaurant sector. Wholesale and retail trade, public services and statutory authorities and mining and quarrying each have the average reported around 73, 58 and 41 reported cases.



### 2.5.3 Statistics of occupational disease in Malaysia

The report of occupational poisonings, diseases and injuries are done by hospitals and clinics within the Ministry of Health (Department of Occupational Safety and Health, DOSH). In 2018, a total of 5139 cases of occupational disease and poisoning have been reported to the Occupational Health Division as compared with 6020 cases

reported in the year 2017. Penang (1176), Johor (827) and Selangor (704) have reported the most number of occupational disease and poisoning cases for the year 2018. A total of 3058 cases were confirmed as occupational diseases and poisonings and workplace improvement in terms of occupational health was carried out. A total of 1775 cases were confirmed as occupational noise-induced hearing disorders (Noise-induced Hearing Loss, Hearing Impairment, and Permanent Standard Threshold Shift) and these disorders are still the most common occupational disease experienced by workers as compared to other diseases. This was followed by non-occupational diseases, a total of 1058 cases and Occupational Muscular Skeletal Disorders (OMSD), of 85 cases. There were no confirmed cases of occupational cancer and Psychosocial Problem in 2018.

## 2.6 Ergonomic risk in airport

According to National Institute for Occupational Safety and Health (NIOSH), Ergonomics Division which stated that the ergonomic can lead to occupational musculoskeletal disorder (MSDs) and is one of the most critical problem ergonomists encounters in the workplace. As the recent statistic data revealed by the Department of Occupational Safety and Health Malaysia (DOSH) which stated that 85 cases that are related to occupational musculoskeletal disorder (MSDs) were reported.

The airline industry is exposed to many safety and health hazards that could potentially lead to serious injury. A recent review of the literature on this topic by Çakıt (2018) many related tasks of landside and airside service include transferring baggage between carts and aircraft, and pushing and pulling heavy baggage often in

standing, kneeling, bending, squatting and stretching postures mostly in the tarmac area of the airport.

Ergonomic is a science concerned between people and their work; thus, ergonomic need to make sure the tasks, equipment, information, and the environment fit the workers. In a study by Stålhammara *et al.,* (1986) performed a laboratory simulation of baggage handling in a DC-9 (100 cm ceiling height) to study the effects of different working postures. In their analysis of biomechanical assessments, no one posture was better or worse across all of their measures in that postures with higher erector spine activity tended to have somewhat lower trapezius activity and vice versa.

Airline most challenging issues are involving baggage logistic, baggage handler need to make sure all of the passenger's luggage is put at the conveyers and smoothly distributed on time. Thus this effect the worker compression on the body while transferring the luggage rashly; thus, physical capabilities in luggage handling technique and work performance among workers should be coordinated within the work environment. (Lin *et al.,* 2015). Affirmed by Shikdar and Sawaqed (2003) company that does not apply the standard ergonomic design in the workplace may lead the employee to get emotional depression, develop physical exhaustive and lost work productivity and quality.

### 2.6.1 Relationship between Body postures and stress

As mentioned by Ertugrul (2004), body posture can lead to work stress. For example, prolonged static movement can reduce blood flow to tendons, which is likely to cause fatigue and strain. Like other researchers, Mork and Westgaard (2007) have highlighted stress resulting from frequently working with hands above shoulder level besides stress related to body posture may be triggered by the neck, shoulder, and arm, thigh, and knee problems.

It has been suggested by Kushwaha and Kane (2016) that pain and stress could be minimized, the work environment can be made more comfortable if the company make a minor adjustment of the tools such as a table, chair, machine, and other devices. In order to understand this (Cook *et al.*, 2004) stated that adjustable chairs and chairs with armrests would help to minimise strains on the neck, shoulder and arm muscles. Several studies have been carried out by Koblauch (2015) that stated the average weight of a suitcase is 15 kg but many airlines allow baggage weights up to 32 kg (Qatar Airlines, MAS Airline, AirAsia, British Airways, etc). The Aircraft of Boeing 737-800 is the most widely used commercial aeroplane worldwide. This requires the baggage handler to perform lifting in awkward positions, of which the most common are kneeling, stooped and sitting position. According to (Bergsten *et al.,* 2017) It is suggested that psychosocial factors at work are associated with risks of developing disorders in the lower back, neck or shoulder area and upper extremities. The author (Bergsten *et al.*, 2017) also claim that psychosocial work conditions may have a critical role when productivity goals are met, such as, for baggage handling, average time spent loading or unloading an aircraft, frequency of departures on time, amount of baggage being conveyed undamaged, and amount of baggage going to the accurate destination.

The study revealed by Magnusson and Pope (1998) stated the associations between psychosocial factors and musculoskeletal disorders (MSDs), which to identify the physical workloads among baggage handlers to possible interventions on the physical workloads hazard. In the analysis by Koblauch *et al.,* (2015), improper body posture and repetitive movement may develop low back pain (LBP) is the reason for the frequent cause of sick leave among employees. Also mentioned by (Punnett *et al*., 2005) implies that LBP is also a sizeable occupational health problem and LBP is caused by occupational exposure and many occupational groups have an increased prevalence of LBP. This effect persisted when adjusted for age, BMI, smoking and leisure-time physical activity. Hence, it appears that baggage handlers are at increased risk of sustaining LPB asserted by Koblauch *et al.,* (2015)

The risk factors for the development of LBP describes by (Coenen *et al.,* 2014) are psychological work pressure, cigarette smoking and alcohol consumption, whole-body vibration; repetitive work and handle heavy lifting are some of the most critical risk factors for LBP. (Coenen *et al.,* 2014) also claim that High frequency of lifting, asymmetrical lifting, lifting in confined space and lifting in awkward positions all will increase and worsening the risk of LBP.



### 2.6.2 Relationship between Work area design and stress

There is a considerable studied done by Shahnavaz (1996) a practical ergonomic design can minimise stress at the workplace, the researcher has observed the development of ergonomics design as an instrument to decrease stress in a working environment. However, research on ergonomics as a mechanism to reduce stress is still diminutive, especially in the Malaysian context, since knowledge and awareness

on the importance of ergonomic concepts are still minimal. According to (Makhbul *et al.* 2011; Makhbul and Hasun, 2007) the goal of Ergonomics is to provide maximum productivity with minimal cost, as the principle of ergonomics is to design ergonomic equipment and workplace that has a minimal hazard to injury and preemptive Ergonomics stresses.

In several studies by Huang *et al.,* (2002) designed operations that ensured proper selection and use of tools, job methods, workstation layouts and materials that impose no undue stress and strain on the worker. Besides, the researcher also mentions that through recognising, anticipating and reducing risk factors in the planning stages of new systems of work or workplaces in considered necessary, hence help to minimise pain and stress and also result in comfort to the employees. For example, chairs used by workers to fulfil three principle functions: increasing individual efficiency; reducing fatigue and stress at the workplace; fitting the body posture Huang *et al.,* (2002). Besides chairs, physical environments of the ergonomic workstation such as lighting, anthropometry control, and workstation environment could minimise work stress (Aaras *et al.,* 2001).



More recent evidence by Bao *et al.,* (2016) and Fairbrother and Warn (2003) highlighted the fact that employee that expose to biomechanical included forceful exertions, repetitions, duration of exertions, and hand or wrist posture have the prevalence to Individual differences factors that related to stress and organizational — stated by (Robertson *et al.,* (2013) employee that have different physical attributes, perception, personality, and behaviour determined they would be able to fulfil the job requirements within poor workstation design, this situation also has made work stress to becoming a more significant problem which can affect an organisation‘s productivity. Dempsey *et al.,* (2004) suggested that innovative

approach design from an ergonomics perspective can effectively enhance productivity and minimise stress through the interaction between the various system components.

### 2.6.3 Relationship between Adjustable chair and Stress

The function of the chair is performed in three ways, and firstly it helps to increase the worker effectiveness during work, minimising fatigue and stress at the workplace, and fitting the body posture comfortably (Kushwaha and Kane, 2016). According to Beckett (1995) stated that an ergonomic chair would not only allow employees to perform their tasks, but it also aids in faster work completion and minimised work stresses.

A recent review of the literature on this topic by Niekerk *et al.,* (2012) stated that sitting prolongs in discomfort chair has affected with musculoskeletal pain especially with a worker that spends more time working at the workstation. According to Hagberg (1995) workers that are suffering pain and discomfort from musculoskeletal symptoms that related to prolonged sitting are advised to alter to an ergonomic chair. Supported by Tittiranonda *et al.,* (1999), an ergonomic chair can prevent the effect thus can help to prevent spinal pain and reduce the occurrence of musculoskeletal. Workers that experience strain at the neck, shoulder, and arm muscles could be minimised by using adjustable chairs and the one which has armrest attached Cook *et al.,* (2004). Tarun *et al.,* (2017) suggested that chair less chair or exoskeleton decrease the pressure of employees during working hours, depending on the workstation of the employee. The mechanical ergonomics device designed following the shape and function of the human body, with segments and joints corresponding to the employee.

### 2.6.4 Relationship between Health and Work Stress

Health is categorised by five-dimensional these are such emotional (mental) health, physical health, social health, spiritual health and mental health (Hettler, 1977). McCleary et al. did research., (2017) stated that mental disorders, especially depression, are growing reasons for work disability and early retirement, the researcher asserted that Mental illness contributed to the increase in the global suicide rate, with one death recorded every 40 seconds. According to National Health Morbidity Survey (NHMS), (2015) An adult man and women are the most higher range to suffered from some form of mental health illness such as anxiety, stress, psychosis, depression, and schizophrenia. They have encouraged all companies to implement plans to prevent or reduce stress by creating a healthy psychosocial work environment and develop organisational functions and culture that can reduce workplace stress.

Asserted by Chu *et al.,* (1997) employee is affected by many dimensions of their home and work life, there are employee who is smoking, workouts daily and eats a perfect diet yet can also be a workaholic, have insufficient social support, be depressed, and be highly susceptible to stress or physical breakdown. While, the employee that has high energy, well-liked and productive worker can be associated with cocaine addict and depression.

According to World Organization Health (WHO), an unhealthy work environment can affect an employee‘s physical and mental health problems while unemployment may lead to a risk factor for mental health problems. This also agreed by (Bethune, 1997) that the health effect on workers may occur and are linked to psychosocial stress and the financial problems. A review of the literature on this topic by Whitehead (2006) found that an employee that was practising an unhealthy lifestyle

in a workplace has been found to affect workers particularly on the level of stress and stress-related conditions such as hypertension, coronary heart disease, asthma, backache, mental health and quality of life.

Shen *et al.* (2005) stated that health is associated with low job control, high psychological demand, and occupational stress. However, research by Walker *et al.,* (1987) the researcher developed a model of health-promoting lifestyle profile (HPLSP) and suggested that health preventive and health promotion behaviours among workers may reduce the chance to get stress. Work should be experienced as a contribution to health and well-being and as a source of satisfaction and pleasure and not a source of psychological distress and ill health (Price and Kompier, 2005).

### 2.6.5 Relationship between Work environments (Humidity, Lighting, Noise) and stress

Donald *et al.,* (2005) is entirely justified employee that frequently complain about working discomfort and job dissatisfaction are highly exposed to extreme heat, cold, or dry in working environment they also associated to mental health disease, depression and can affect job productivity. Bunce and West (1994) Opined that it affects workers‘ abilities to perform well in daily duty and thus effects the level of productivity in the workplace. Within the airline industry that exposes to extreme noise work stress possibly will be overcome by providing a comfortable workstation environment and minimum noise level (Fairbrother and Warn 2003). However, there is still a need for improvement in controlling the level of noise and lighting elements in the organisations which play an essential factor in minimising work stress (Sutton and Rafaeli, 1987). The high level of glare and minimum lighting, for instance, could

cause eye strain and lead to stress at the workplace (Aarås et al., 2001; Leather et al., 2003).

Michie and Williams (2003) opined that it is very plausible that an increase in productivity can be achieved through developments in the organisation of work, job satisfaction, workplace layouts or suitable work schedules. Environmental stressors within the workplace are associated with adequate lighting and noise disturbance, work performance, and wellbeing. This may affect the employee resilience on coping work demand, decrease the level of motivation, fatigue and distractibility functioning work performance (Lamb and Kwok, 2016).

### 2.6.6 Relationship between Working hours and stress

According to Persaud and Williams (2017) long working hours defined as on duty exceeding eight hours per day or more than 40 hours per week thus shift work is among the stressors among workers that working in 24/7 operation. This is about 0 to 30 per cent of employees disinclination in shift system as they would experience insomnia, discomfort in digesting system and mental function that ended with stress, this is due to industry demand worker working in shift hours has interrupt the circadian rhythm, sleep pattern and work-life balance (Åkerstedt *et al.,*. 2002). A growing body of literature has studied by Persaud and Williams (2017) agreed that long working hour is associated with the work-related disease, researcher mention that working more than 60 hours per week carries a risk in developing Coronary heart disease and occupational stress-related illness and injury among employees.

A long working hour with insufficient rest could result in chronic fatigue and that working without rest in a long hour may increase the stress level and contribute to an

accident (Makhbul and Idrus, 2009). Several studies by Iacovides *et al.,* (2003) on the effect of employee forcing to work more than suggestible hours have showed the employee to be exhaustion and enervation which leads to stress and be a source of accidents at the workplace furthermore shift work is one of the factors responsible for cardiovascular and metabolic disorders among shift workers.

## 2.7 Conclusion

This chapter presented a literature review which focused on the relationship between relevant factors that might contribute to ergonomic problems and job stress as the impact of all the ergonomic problems. The next chapter describes the procedures and methodology that are used for data collection and analysis in this research.

# CHAPTER 3

# METHODOLOGY

## 3 Introduction

The purpose of this chapter is to explain the research methodology that is used to explore the relationship between ergonomics and job stress among airport staff. The chapter begins by outlining the research design, types of research, time frame, unit of analysis, population, sampling procedures, survey measurement and it is also comprised of a justification for the method that is chosen for this study. The chapter also outlined the data collection procedure that is chosen along with discussing any research limitations are encountered during the study. Finally, it discusses the data analysis and then a conclusion.



## 3.1 Theoretical framework

The framework of this study is divided into two parts: independent variables and dependent variables. The dependent variable is stress among airline staff. The independent variables are body postures, health, work area design, work chair, humidity, and lighting, acoustics and working hours. Diagram 1 shown the theoretical.

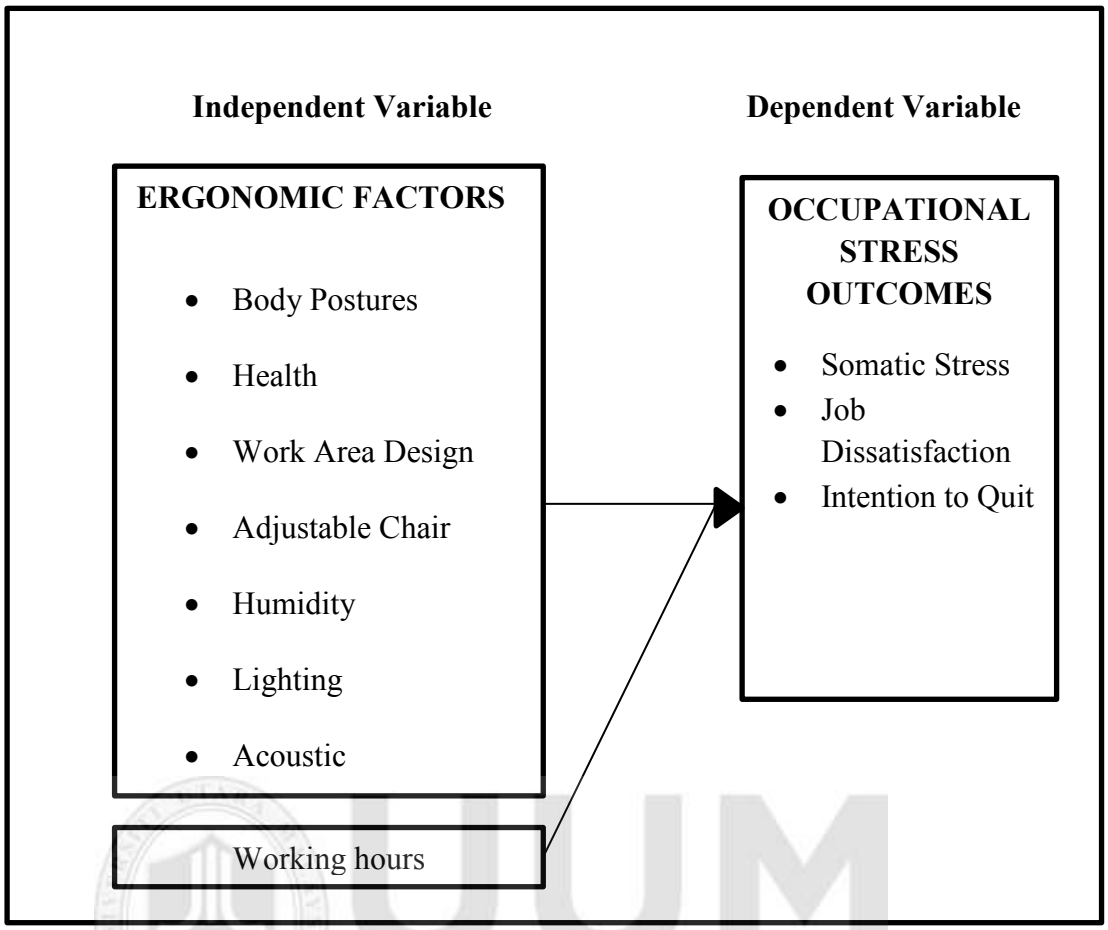




**Figure 1: Conceptual Framework for Stress and Ergonomic**

Adapted from (Makhbul et al., 2011)

A series of the hypothesis is developed to examine the ergonomic problems which are body posture, health, work area design, adjustable chair, humidity, lighting, acoustic and working hour and the impact of all of these ergonomic problems towards work stress.

## 3.2 Research Design

The research design plan is to show the study to answer the research questions and achieve the objective of the study. Sekaran and Bougie (2010) described the research design as the design gathered by the researcher to examined and attain a solution. This is supported by McCusker and Gunaydin (2015) who described survey research design as a systematic, experimental review into which the examiner did not have prominent control of the independent variable as their indicator because they fundamentally cannot be manipulated. Thus, in order to determine the current position of that particular population, data collection design that concerning one or more variable is conducted and given to the selected population. Hence the design is designated to fulfill the phase of the study where a sample population is used to get physiognomies of the mass target population (McCusker and Gunaydin, 2015).

### 3.2.1 Type of research design



This research is to determine the ergonomic problem and stress among airport staff. The research studied based on questionnaires distributed to airport staff Kuala Lumpur International airport. This questionnaire covered demographic factors such as age, gender, height, weight, work experience which is comprised of questions on ergonomic and stress. Respondent is needed to respond to the question based on their own experience.

Cross-sectional researches studies are based on observations to different groups at one time, this research is conduct without any experimental procedure to eliminate manipulation on variables by the researcher. This method is used to gather information only. The information may then be used to develop other methods to investigate the relationship that is observed. Besides that these studies are relatively

fast and inexpensive, using this type of study can give the information about the prevalence of outcome or exposes that useful for designing the cohort study (Setia, 2016).

## 3.3 Operational Definition

An adequate operational definition uses to refer to the definition of a conceptual variable is turned into a measured variable in this study.

Table 3.1: Operational Definition

| Ergonomic Variable | Definition | Sources |
|---|---|---|
| Body Posture | Indicate the period of a worker spend in uncomfortable body movement and posture during working hours. | Makhbul and Idrus (2009) |
| Health | Indicate the stress level of worker when performing their job that effect health state. | Zafir and Durrishah (2009) and Karasek et al., (1998) |
| Workstation Area Design | State the level of comfort of the worker workstation. | Zafir and Durrishah (2009) and Karasek et al., (1998) |
| Adjustable Chair | Indicate the frequencies of worker adjusting their working chairs. | Zafir and Durrishah (2009) and Karasek et al., (1998) |
| Humidity | Describe the air circulation level within the workstation. | Zarif and Durrishah (2009) |
| Acoustics | Indicate the level of sound interruption during working hours. | Zarif and Durrishah (2009) |
| Working hours | The amount of time a worker spends daily when performing their job. | Zafir and Durrishah (2009) |

| Stress Outcomes Variable | | |
|---|---|---|
| Somatic stress | The level of stress concurrency within the workplace that leads to an unhealthy work environment. | Zafir and Durrishah (2009), Tarcan et al., (2004), Karasek et al., (1998) and Makhbul and Idrus (2009) |
| Job dissatisfaction | Indicate the level unsatisfactory on the job responsibility of workers when performing their job. | Makhbul and Idrus (2009) |
| Intention to quit | Indicate the worker attitude toward the organization | Zafir and Durrishah (2009), Tarcan et al., (2004), Karasek et al., (1998) and Makhbul and Idrus (2009) |

### 3.3.1 Unit of analysis

For this study, the unit of analysis is among the airport staff from the Kuala Lumpur International Airport. The data was collected through the distribution of questionnaires. The time duration for the distribution process lasted for two month (January until February 2019).



### 3.3.2 Population

According to Sekaran and Bougie (2010) population is any whole group of people or organizations used by the researcher to do an investigation to specify interest. According to Cooper and Schindler (2014), population could be people, place, object and cases which a researcher wishes to make inferences. This study is carried out with the purpose to identify whether there are relationships between independent variables towards occupational stress among airport staff in Kuala Lumpur

international airport, Sepamg. Thus, the sample population for this study is 10,799 airport staff that are working under Malaysia Airport Holding Berhad (MAHB Annual Report, 2018).

### 3.3.3 Sample size

According to Cooper and Schindler (2006), sampling is the process of choosing some elements from a population so that it represents that population. Sample is the subset of the population (Zikmund, 2003; uma and Roger, 2009), which is studied in order for the research to be generalized on the overall population of study (Creswell, 2008). This is because it is unrealistic to collect all the data from this population, therefore the determination of the sample size is important (Zikmund, 2003).

For this study, the table for determining sample size for a given population developd by Krejcie and Morgan (1970) has been adopted. This is because it takes into cognizance the level of confidence and precision so that the sampling size error is minimized. Therefore, based on krejie and Morgan (1970) table, for a population of 10,799 employees, 370 samples are adequate for the data analysis. This sample size was also according to the Roscoe‘s rule of thumb (Sekaran, 2007) which is stated that a sample larger than 30 and less than 500 is appropriate for most research.

### 3.3.4 Sampling technique

The researcher gathers the data by collecting from the respondents with the period of time given to answer the research question. For this research, the researcher has used simple random sampling to get respondents ( Cooper and Schindler, 2008). Hence, by using this method each member of the population has an equal chance of being chosen for the study. Furthermore, proper information can be suitably carried out, which can be convenient, fast, economical and reliable (Tryfos, 2001).

The research design of this study is a simple random sampling (Thompson, 2012) defined simple random sampling study as a sampling design in which (N) distinct units are selected from the (N) units in the population in such a way that every possible combination of (N) units is equally likely to be the sample selected. A systematic random sample is prepared as described by (Thompson, 2012) illustrated by taking a piece of paper and writing the numbers 1 through N, then put the pieces of paper in a covered box or container, stirring them thoroughly and selecting any one of the pieces of paper without replacing any. The second digitalize way is using a computer random number generator, the computer will automatically choose a number base on the number set by the researcher. This may able to reduce the labor of the selection process and to avoid problems.

## 3.4 Measurement

### 3.4.1 Instrument

In this study, occupational stress refers to feeling or response of employee in a workplace when work pressures and demand by employers to exceed their capabilities to meet job expectations (Mohajan, 2012). While Ergonomic related to the design of workplace and ergonomic types of equipment, machine, tool, product,

and system. In measuring Ergonomic factors, instrument that was developed by Zafir and Durrishah (2009), Tarcan et al., (2004), Karasek et al., (1998) and Makhbul and Idrus (2009) was adapted. The instrument, which was done to study ergonomic factors among airport staff, has a very high reliability, internal consistency and validity, the reason why it was chosen in this study. It was found that the Cronbach's alpha for this instrument was 0.835 in the study. As a result, the final items were 61 items. A 5 – point Likert scale has been used for this instrument ranging from strongly disagree to strongly agree ( 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree). The display of noth the original and adapted versions are shown in Table 3.2.

Table 3.2
*Measurement of variable or instrumentation*

| **Sections ( IV 1)** | **Items** | **Source** |
|---|---|---|
| Body posture | 1. My job needs me to frequently stand up from my working chair.<br>2. My job needs me to frequently carry heavy objects.<br>3. My job needs me to stand for long periods.<br>4. I do repetitive movements for long periods of time.<br>5. I work in an uncomfortable posture.<br>6. I do repetitive tasks and frequently use my arm, hand, or fingers.<br>7. My job makes me physically exhausted at the end of the day.<br>8. I always hunch to do my tasks at my workstation.<br>9. The arrangement at my work and the seat at my workstation are congested | Zafir and Durrishah (2009), Tarcan et al., (2004), Karasek et al., (1998) and Makhbul and Idrus (2009) |
| Health | 1. I have taken sick days because of stress.<br>2. I experienced sleeplessness/irregular sleep habits due to problems related to work.<br>3. I feel tensed with my current job<br>4. I have trouble sleeping due to stiffness/aching at my muscles or joints.<br>5. I have an unsatisfactory health level. | Zafir and Durrishah (2009) and Karasek et al., (1998) |
| Adjustable chair | 1. I can adjust my work chair easily.<br>2. My working chair is adjustable to various | Zafir and Durrishah (2009) |

| | | |
|---|---|---|
| | positions.<br>1. My working chair is adjustable. | and Karasek et al., (1998) |
| Humidity | 1. My work space's internal temperature is too hot.<br>2. There is minimal ventilation in my work area.<br>3. My work area's air is too dry.<br>4. Unpleasant odors are present in my work area.<br>5. My work area's air is too stale. | Zarif and Durrishah (2009) |
| Acoustics | 1. The noise level in my work area is within normal limits.<br>2. The workstation's environment has no noise problem.<br>3. Efforts are continuously made to minimize the noise level in my workstation area. | Zarif and Durrishah (2009) |
| Lighting | 1. The lighting in my work area is satisfactory.<br>2. A flexible lighting system exists at my work area.<br>3. The bright lighting increases my job performance.<br>4. Adequate lighting is supplied when I am doing my tasks. | Zarif and Durrishah (2009) |
| **Sections ( IV 2)** | **Items** | **Source** |
| Working hours | 1. I feel satisfied with the working hours fixed by the organization.<br>2. I am given sufficient rest periods within my working day.<br>3. The fixed working hour does not affect my personal life | Zafir and Durrishah (2009), |
| **Dependent variable** | | |
| Somatic Stress | 1. Sometimes I feel burned out.<br>2. I easily feel annoyed/irritated with my workstation environment.<br>3. Work problems cause me to have abdominal discomfort.<br>4. Work problems make my heart beat faster than usual.<br>5. I lose my appetite due to work problems.<br>6. I easily get tired of work.<br>7. I feel demotivated to complete given tasks.<br>8. Tiredness due to work makes me depressed and discourages me from doing work. | Zafir and Durrishah (2009), Tarcan et al., (2004), Karasek et al., (1998) and Makhbul and Idrus (2009) |
| Job dissatisfaction | 1. When thinking about work, I feel tired and temperamental.<br>2. I am not satisfied with my current job.<br>3. Generally, I dislike my current job.<br>4. My jobs are repetitive and boring. | Makhbul and Idrus (2009 |
| Intention to quit | 1. I like to work for this organization.<br>2. I will strive for the organization's development. | Zafir and Durrishah (2009), |

| | | |
|---|---|---|
| | 3. I am proud to work in this organization.<br>4. I will tell my friends that this organization is a good place to work in.<br>5. I care so much about this organization's fate.<br>6. I have never thought about quitting and join other companies. | Tarcan et al., (2004), Karasek et al., (1998) and Makhbul and Idrus (2009) |
| Demographic data | 1. Gender<br>2. Marital status<br>3. Educational level<br>4. Race<br>5. Age<br>6. Year of service<br>7. Salary<br>8. Working hour per week<br>9. Role | |

### 3.4.2 Questionnaire Design

The survey questionnaire consists of 7 pages attached together with a personal cover letter. The questionnaire was prepared in English language and Bahasa Malayu because this is to helped respondents to understand the questionnaire better according to their preferences. The questionnaires consist of twelve (12) sections. In section A of the questionnaire, respondents are asked about the personal information which includes questions on social-demographic details such as gender, age, education background, monthly gross salary and year of service. Section B, C, D, E, F, G, H and I consist of the questions measuring the variables; body postures, health, adjustable chair, work area design, humidity, acoustic, lighting, working hours. In sections J, K and L consist of question measuring the dependent variable of occupational stress outcomes.

### 3.4.3 Translation

In this study, the questionnaire came in both languages of English and Bahasa Malayu as it helped respondents to understand the questionnaire better according to their preferences.

### 3.4.4 Data Collection Procedure

Data collection method discuss about the process of gathering and measuring information on targeted variable in an established systematic research. Prior to collection of data from Malaysia Airport Holding Berhad (MAHB), Sepang, a letter of authorization and to whom it may concern for the purpose of data collection was obtained from Othman Yeop Abdullah Graduate School of Business (OYA) requesting for their kind cooperation and assistance in data collection. After that, approval from the company was gained before distributing the questionnaire. The questionnaires were distributed in January 2019. The respondents were given assurance that their responses will be kept confidential, in order to encourage participation from respondents. The distributions of the questionnaires were done with the help of HR Executive, due to the different types of shifts in the airport which are day shift, afternoon shift and night shift. So it is difficult to meet all the staff at the same day. Besides that the schedules of off days for the staff vary among each other. The respondents were not allowed to answer the questionnaire more than once. Due to the differences in the work schedule, this has posed restriction for the collection of questionnaire, and it took about two months for data collection period. Out of the 400 questionnaires that were given, only 370 have responded. The response rate was 92.5%

### 3.5 Pilot study

For the reliability of data, Cronbach‘s Alpha is used for the study. Cronbach‘s Alpha is a reliability coefficient that indicates how well the items in the dimensions are positively correlated to one another (Sekaran and Bougie, 2013). To examine the values of data, the reliability and validity of the measures are tested. The reliability of each scale with the specific sample is important to be check accurately to make sure the scales are reliable. Questionnaires were sent to 80 respondents, but only 50 responded and used for the study. Time taken to complete the questionnaires ranged from 15-30 minutes. Feedback from the respondents showed that most of them could understand the clarity of words with minimal changes needed. The reliability test as measured to ensure no bias (error free). Cronbach‘s Alpha is a reliability coefficient that will indicate the correlation between the variables (Sekaran and Bougie, 2013). The results of the reliability tests are presented in Table 3.3.

Table 3.3*: Result of a pilot test using Reliability Analysis – scale alpha*

| Variable | Number of Items | Cronbach’s Alpha |
|---|---|---|
| Body posture | 9 | 0.743 |
| Health factor | 5 | 0.739 |
| Working chair | 3 | 0.771 |
| Work area design | 2 | 0.807 |
| Humidity | 5 | 0.778 |
| Acoustics | 3 | 0.774 |
| Lighting | 4 | 0.769 |
| Working hours | 3 | 0.773 |
| Stress | 8 | 0.779 |
| Job Dissatisfaction | 4 | 0.840 |
| Quitting | 6 | 0.856 |

Cronbach‘s alpha for these 11 items is 0.804 which is considered good according to (George and Mallery, 2010).

Based on the result of the reliability test, it is indicated that all the values of the Cronbach alpha for both the dependent and independent variables were all more than 0.7. Therefore it can be concluded that all items for all the variables in this study are reliable and have a good value.

## 3.6 Technique of Data Analysis and hypothesis Testing

The response rate, demographic profiles of respondents‘ frequency statistics, reliability analysis, descriptive analysis, multicollinearity, normality analysis, Pearson correlation analysis, and multiple regression analysis were performed using the Statistical Package for Social Science (SPSS) for Windows version 21 software.

### 3.6.1 Descriptive analysis

Descriptive analysis is one technique used to summarize big data from target respondents or sample (Hair *et al.,* 2006). According to Coakes and Steed (2007), descriptive analysis is used to explore, summarize and describe data collection acquired from a survey. Demographic data from a sample can be described using descriptive analysis. For variables such as working experience age, mean, standard deviation, minimum and maximum values can be used to describe data. For variables such as gender, race, types of employment and marital status, frequency analysis can be used to describe data. The frequency percentage of the sample can also be obtained, however, this analysis only provides details about respondents and unable to draw any conclusion from the sample.

### 3.6.2 Inferential analysis

According to Hair et al., (2006), inferential analysis is the most suitable way to explain the hypothesis. Examples of inferential analysis that will be discussed below are normality test, multicollinearity test,

### 3.6.3 Normality Test

According to Kim (2013), normality tests are used to determine a data set is modeled for normal distribution or nearly normal. Skewness is a measure of the asymmetry and kurtosis is a measure of the highest peak of a distribution.



### 3.6.4 Multicollinearity

Multicollinearity test was carried out to observe if there is a high correlation that occurred within regression analysis when an independent variable with a combination of the other independent variables (Kraha *et al.,* 2012). According to Norušis (2011) two collinearity diagnostic factors that help to assess multicollinearity by examining tolerance and the Variance Inflation Factor (VIF).

### 3.6.5 Reliability Analysis

To determine the accuracy of data input, data loss problem and solve the problem of reliability. Reliability is confident in the accuracy of the data and of the measurement instrument (Kerlinger & Lein, 1986). According to (George & Mallery, 2010), the greatest value of Cronbach alpha as below table:

*Table 3.4: Range of Cronbach alpha value*

| P | T |
|---|---|
| ≥ 0.9 | Best (highly reliable) |
| 0.7 ≤ a < 0.9 | Good |
| 0.6 < a ≤ 0.7 | Can be accepted |
| 0.5 – 0.6 | Weak |
| < 0.5 | Not Acceptable |

*Source:* (George and Mallery, 2010)

### 3.6.6 Correlation Analysis

According to Coakes and Steed (2007), Pearson correlation is used to test the relationship between the dependent and independent variables. In this study, the researcher will identify the strength and direction of relationship between independent variables ergonomic factors (body postures, health, work area design, adjustable chair, humidity, lighting, acoustics and working hours) with dependent variable which is Occupational stress outcomes ( somatic stress, job dissatisfaction and intention to quit) among airport staff in KLIA. Positive and negative correlation can be identified by measuring the strength. Interpretation of the correlation coefficient can be done by identifying the coefficient and its associated significance value (p) (Coakes and Steed, 2007). For two quantitative variables, X and Y, a positive correlation is indicated when a higher value of X is associated with a higher value of Y, whereas if a high value of X is linked with low value of Y, a negative correlation occurs. In other words, if the result showed +1.0, interpretation indicates the values as perfect positive correlation meanwhile, if result -1.0 indicates the value as perfect negative correlation (Gliner *et al.,* 2009). The closer the value of the coefficient is to 1.0, the stronger the correlation between the two variables. For

significance value (p), the acceptable value is either 0.01 or 0.05 (Coakes and Steed, 2007).

### 3.6.7 Multiple Regression Analysis

Regression analysis is to determine how much of the variance in the dependent variable or measure can be explained by a set of predictors or independent variable. The standard linear regression analysis as inferential statics is thoroughly checked for in testing the hypotheses of this study (Mason and Perreault, 1991).

According to Hair *et al.,* (2010), multiple regression is used to predict the changes in the dependent variable in response to changes in the independent variables. In other words, the researcher wants to identify which independent variables have the most influential factor on a dependent variable (Sekaran and Bougie, 2013). Once a multiple regression equation has been constructed, the researcher can check how good it is ( in terms of predictive ability) by examining the coefficient of determination, R-square (R2). The value of R2 is between 0 and 1. Bhatti et al., (2012) has stated that the higher the R2 value (variance) the better the model and its prediction. In this study, 8 hypotheses were generated, and to decide whether the hypotheses is rejected or not, the coefficient table at the column Sig. will produce the p-value. The hypotheses is accepted if p is < 0.05, otherwise, the hypotheses will be rejected.

## 3.7 Conclusion

In this research, the researcher has pinpoint all the procedures involved to carry out this study. It explains on the research framework, the instrument used population and samples involved, pilot study and the method of analyses for the collected data. The next chapter will discuss further interpretation finding of the data analysis.

# CHAPTER 4

# DATA ANALYSIS AND FINDINGS

## 4 Introduction

This chapter discusses the result that has been generated from the study based on the analysis done on the data collected from respondents. The findings of the respondents‘ descriptive analysis and the mean of each variable will be identified. Frequency analysis has been done to identify respondents‘ demographic profile such as gender, age, marital status, working experience, citizenship and academic qualification. The hypotheses of this study which has been identified in Chapter 2 will be tested using 2-tailed Pearson correlations analysis and multi regression analysis.



## 4.1 Respondent Rate

In this research, 400 sets of questionnaires distributed to the employees in KLIA airport which were selected through simple random sampling method. One representative from the company helped to distribute the questionnaires. Out of 400 questionnaires, only 370 questionnaires were returned.

Even though the returned questionnaire did not reach 400 based on the Krecjie and Morgan table, the sample size which is more than 30 and less than 500 is generally sufficient for a research (Altunisik et al., 2004). The response rate was (92.5 %). According to Hair et al., (2010), the response rate that is more than 50% is acceptable, thus significantly strong to be used for this study. Table 4.1 illustrates the summary of the response rate in this study.

Table 4.1
*Rate of Response*

| Items | Total | Percentage (%) |
|---|---|---|
| Distributed Questionnaires | 400 | 100 |
| Collected Questionnaires | 370 | 92.5 |
| Unreturned Questionnaires | 30 | 7.5 |

## 4.2 Demographic Information

Section 1 from the survey form specifies demographic profile of the respondent. The following table explained the detail of the demographic profile of respondents.

Table 4.2
*Respondent Demographic Information*

| **Variable** | **Frequency** | **Percentage (%)** |
|---|---|---|
| **Gender** | | |
| Male | 207 | 55.9% |
| Female | 163 | 44.1% |
| **Marital Status** | | |
| Single | 220 | 59.5% |
| Married | 143 | 38.6% |
| Divorce / widow | 7 | 1.9% |
| **Education** | | |
| MCE/SPM/SPMV | 99 | 26.8% |
| Diploma | 75 | 20.3% |
| Bachelor | 161 | 43.5% |
| Master | 35 | 9.5% |
| **Race** | | |
| Malay | 188 | 50.8% |
| Chinese | 7 | 1.9% |
| Indian | 99 | 26.8% |
| Others | 76 | 20.5% |
| **Age** | | |
| Less 25 years old | 60 | 16.2% |
| 26 -30 years old | 132 | 35.7% |
| 31- 35 years old | 110 | 29.7% |

| | | |
|---|---|---|
| 36 – 40 years old | 24 | 6.5% |
| 41 – 45 years old | 44 | 11.9% |
| **Years of working** | | |
| Less than 5 years | 324 | 88.5% |
| 6 – 20 years | 38 | 10.4% |
| 21 – 35 years | 8 | 2.2% |
| **Gross Salary income** | | |
| RM1500 –RM3000 | 132 | 35.7% |
| RM3001 – RM4500 | 171 | 46.2% |
| RM4501 – RM6000 | 46 | 12.4% |
| RM6001 - RM7500 | 7 | 1.9% |
| RM7501 – RM10,000 | 14 | 3.8% |
| **Total of a working hour per week** | | |
| 40 – 48 HOURS | 67 | 18.1% |
| 46 – 55 HOURS | 296 | 80% |
| 56 - 65 HOURS | 7 | 1.9% |
| **Job Position** | | |
| Captain and first officer | 7 | 1.9% |
| Flight attendants | 32 | 8.6% |
| Flight engineer | 14 | 3.8% |
| Ramp agents/baggage and cargo handler | 63 | 17% |
| Ticket agents/crew schedulers coordinator | 254 | 68.6% |



The descriptive analysis based on table 4.2 shows that most respondents were male which around 55.9% female respondents‘ accounts for 44.1% of the total number of respondents. In the aspect of marital status, about 59.5% respondents is single, followed by 38.6% who are married and only 1.9% that are either divorced or widowed. In term of education background, the result stated that 43.5% of the respondents are Bachelor holders. Whereas 26.8% of them are MCE/SPM/SPVM level, followed by 20% are Diploma holders, and the remaining 9.5% are Master‘s holders.

When describing about the citizenship, the result shoes that most of the respondents were Malay (50.8%), whereas Indian (26.8%), Chinese (1.9%) and others were (20.5%). Beside that analysis of the age category showed that most of the respondent are aged less than 25 years (16.2%), 35.7% are aged between 26 – 30 years old, 29.7% are aged between 31 – 40 years old, whereas only 11.9% of them were aged between 41 – 45 years old. This is to say that most of the KLIA airport staff was from young generation category.

Most respondents are still in their freshmen, which indicated service within less than 5 years representing about 88.5% of the populations. About 38% of respondents have worked within 6 to 20 years. This is followed by about 8% that have the longest services are between 21 to 35 years of services of the respondents. This could be because most of them were young fresh graduates who like to hop jobs from one and another. In term of salary range, 35% respondents gained monthly salary range from RM1500 – RM3000, mostly 46.2% of the respondents gained monthly salary from RM3001 – RM4500, whereas 12.4% salary range between RM4501 – RM6000, followed by 1.9% salary range between RM6001 – RM7500 and the remaining 3.8% gained monthly salary range between RM7501 – RM10,000.

In response to working hours spent, the majority of those surveyed indicated that about 80% of the staff spent between 46 – 55 hours of work each week. While 18.1% of workers spent 40 – 48 hours of work per week and only 1.9% of workers work between 56 -65 hours per week. Respondent comes from various departments, from the result shows the majority of respondents are ticketing agents and crew schedules coordinator (70%), followed by 16% of the respondents who is a ramp agent, baggage and cargo handler. Whereas 8% are flight attendants, 4% are flight engineers and only 2% are captain and first officer.

## 4.3 Data screening

### 4.3.1 Normality Analysis

Normality is used to describe a curve that is symmetrical and bell-shaped. Normality test is done to examine wheather the data is normally distributed or not (Heir *et al.,* 2003). According to Hair *et al.,* (1998), all the data is normally distributed when the value for Skewness and Kurtosis are within the range -1.98 to +1.98. Skewness assesses the extent to which a variable's distribution is symmetrical (Heir *et al.,* 2017). Kurosis refers to the "peakedness" or "flatness" of the distribution compared with the normal distribution (Heir *et al.,* 2017)

Table 4.3
Result of Descriptive of Normality analysis

| **Variables** | **Skewness** | **Kurtosis** | **Conclusion** |
|---|---|---|---|
| Occupational stress outcomes | 0.256 | 0.617 | Normally distributed |
| Ergonomic factors | -.204 | -.730 | Not normal distribution |



Base on Table 4.3, the values for Skewness and Kurtosis for all the variables fall within the range of -1.98 to +1.98. Therefore it can be concluded that the data in this study fall within the normal distribution range.

### 4.3.2 Multicollinearity

According to Black (2010), muliticollinearity is when two or more of the independent variables of a multiple regression model are highly correlated. In other words, some of the predictor variables are correlated among themselves. Muliticollinearity is a problem that affects many regression models. Presence of

muliticollinearity in the data can be assessed by the tolerance value and variable inflation factor value (Pallant, 2005). Tolerance is a value that measures the degree of the independent variable‘s variability that is not described by the other independent in the model. It is calculated by using the formula 1-R2 for each variable. Whereas variance inflation factor (VIF) is the inverse of tolerance and is counted by inverting the tolerance value (1 divided by tolerance). According to Hair et al., (2010), if the value of tolerance is less than 0.1 and VIF value is 10 and above, then the muliticollinearity is problematic. Table 4.4 shows the calculation of tolerance effect and VIF.

Table 4.4
*Result of Description of Multicollinearity*

| **Model** | | **Collinearity statistics** | |
|---|---|---|---|
| | | **Tolerance** | **VIF** |
| **1** | (constant) | | |
| | Body posture | .087 | 11.461 |
| | Health | .085 | 11.813 |
| | Working chair | .253 | 3.953 |
| | Work area design | .745 | 1.343 |
| | Humidity | .548 | 1.826 |
| | Acoustics | .215 | 4.645 |
| | Lighting | .294 | 3.396 |
| | Working hours | .289 | 3.466 |

Based on Table 4.4 all the tolerance values are more than 0.1. However there are two variables (body posture and health) of VIF values are more than 10 while the other is more than 10, so it can be concluded that there is muliticollinearity exist in this study.

### 4.3.3 Reliability Analysis

Reliability is the degree to which measures are free from error and therefore yield consistent results. According to (George and Mallery, 2010), the closer the reliability coefficient gets to 1.0, the better it is, and all the values over 0.70 are considered as good. Table 4.4 summarizes the reliability test of the variables.

Table 4.4

*Result of Reliability Analysis – scale alpha*

| Variable | Number of Items | Cronbach's Alpha |
|---|---|---|
| Body posture | 9 | 0.789 |
| Health factor | 5 | 0.784 |
| Adjustable chair | 3 | 0.794 |
| Work area design | 2 | 0.846 |
| Humidity | 5 | 0.818 |
| Acoustics | 3 | 0.795 |
| Lighting | 4 | 0.798 |
| Working hours | 3 | 0.796 |
| Stress | 8 | 0.823 |
| Job Dissatisfaction | 4 | 0.883 |
| Intention to quit | 6 | 0.865 |



Cronbach's alpha for these 11 items is 0.835 which is considered good according to (George and Mallery, 2010).

The result from table 4.4 shows that all the Cronbach's alpha values for current study were more than 0.7, which means that all the items in this study were reliable. Among all the variables, job dissatisfaction has the highest reliability for the current study, which is 0.883. Followed by intention to quit which is 0.865 and work area design is 0.846. It can be concluded that the current study shows a higher Cronbach's alpha value compared to original study and pilot study.

### 4.4.4 Descriptive Analysis of Variables

Descriptive statistics is an important tool to summarize a collection of data. The measurement of central tendency (mean) and dispersion (standard deviation) of a data can be determined using descriptive statistics. According to sociologyguide.com, mean is defined as the means of absolute deviation of values from some average while standard deviation refereed as sigma that is important and widely used to measure of dispersion.

In this study, the items used for independent variable and dependent variable are measured by Likert scale. Independent variable has a 5-point Likert scale starting for 1 to 5 (Scale 1= Strongly Disagree, 2= Disagree, 3= Neither Agree or Disagree, 4= Somewhat Agree, 5= strongly Agree). According to Davis (1971), the level of the variable is considered low when the score is 1.00 – 2.33, moderate if the score is 2.34 – 3.67 and high when the score is 3.68 – 5.00. Table 4.6 shows the comparison of mean and standard deviation for each items for ergonomic factors and occupational stress outcomes.



Table 4.5
*Result of descriptive statistics variables*

| Variable | Mean | Standard deviation |
|---|---|---|
| Body posture | 3.49 | 0.547 |
| Health factor | 3.39 | 0.547 |
| Adjustable chair | 3.45 | 0.562 |
| Work area design | 3.22 | 0.576 |
| Humidity | 3.13 | 0.399 |
| Acoustics | 3.36 | 0.488 |
| Lighting | 3.57 | 0.471 |
| Working hours | 3.40 | 0.504 |
| Somatic Stress | 3.35 | 0.342 |
| Job dissatisfaction | 3.13 | 0.535 |

| | | |
|---|---|---|
| Intention to quit | 3.43 | 0.626 |

*(Scale 1= strongly Disagree, 2= Disagree, 3= Neither Agree Nor Disagree, 4= Somewhat Agree, 5= strongly Agree)*

Based on the table 4.5, the highest mean value was obtained from lighting with the mean value of 3.57 and the second highest mean value was body posture with the mean value of 3.49. The lowest mean is for humidity and job dissatisfaction with the mean value of 3.13. The total average mean and standard deviation is 36.92 and 5.597 respectively. This value of mean falls under the category of moderate level.

### 4.4.5 Pearson's Correlation Analysis

Correlation analysis is used to measure the linear relationship between independent variables and the dependent variable (Sekaran, 2003). The result of Pearson's correlations analysis is presented in Table 4.6 which shows the correlation and significance value between dependent and independent variables.

Table 4.6

*Correlation between dependent variable and independent variable*

| | Variables | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Occupational Stress | 1 | | | | | | | | |
| 2 | Body postures | .145** | 1 | | | | | | | |
| 3 | Health factors | .160** | .940** | 1 | | | | | | |
| 4 | Adjustable chair | .027 | .826** | .819** | 1 | | | | | |
| 5 | Work are design | -.034 | .179** | .254** | .332** | 1 | | | | |
| 6 | Humidity | .281** | .629** | .625** | .477** | -.046 | 1 | | | |
| 7 | Acoustics | .104* | .756** | .812** | .754** | .282** | .516** | 1 | | |
| 8 | Lighting | .207** | .653** | .726** | .694** | .398** | .803** | .803** | 1 | |
| 9 | Working hours | .166** | .799** | .790** | .711** | .210** | .773** | .773** | .687** | 1 |

** Correlation is significant at the 0.01 level (2 tailed)

*Correlation is significant at the 0.05 (2 tailed)

Based on the result from Table 4.6, shows there is significant relationship between ergonomic factors and occupational stress outcomes. Since the value of coefficient correlation has a negative sign, it can be concluded that there is negative moderate relationship between work area design (r= -.034 and p=.000; p<0.01) and humidity (r=.281 and p=.000; p<0.01) toward occupational stress outcomes. Therefore hypothesis 1 C and E which states that –There is significant negative relationship

between work area design and humidity toward occupational stress outcomes" is not accepted.

Meanwhile the result of the analysis shows that there is a significant positive relationship between body posture (r=.145 and p=.000; p<0.01), health (r=.160 and p=.000; p<0.01), adjustable chair (r=.027 and p=.000; p<0.01), acoustic (r=.104 and p=.000; p<0.01), lighting (r=.207 and p=.000; p<0.01) and working hours (r=.166 and p=.000; p<0.01) with occupational stress outcomes. With this analysis six hypotheses were supported thus –There is significant positive relationship between body posture, health, and adjustable chair, acoustic, lighting and working hours is accepted.

In conclusion, all the independent variables have moderate positive relationships with dependent variable, except for work area design and humidity which has a negative relationship. The independent variable with the highest correlation with dependent variable is humidity, lighting and working hours, the second highest correlation is health and body posture and the least relationship is found to be acoustic.

### 4.5.6 Multiple Regression

Multiple regression is a procedure to analyze how independent variables predict the values of dependent variable (Zikmund, 2003). In this study, regression analysis is conducted to identify further influence between independent variables (body posture, health, adjustable chair, work area design, humidity, and acoustic, lighting and working hours) with occupational stress outcomes (dependent variable). Table 4.7 illustrates and presents the influence of body posture, health, adjustable chair, work

area design, humidity, and acoustic, lighting and working hours towards occupational stress outcomes.

Table 4.7
*Result of multiple regression in evaluating the relationship of Body posture, Health, Working Chair, Work Area Design, Humidity, Acoustics, Lighting and working hours with occupational stress outcomes.*

| **Standard Beta Coefficients** | **β** | **t** | **Significant** |
|---|---|---|---|
| Body postures | .031 | .137 | .891 |
| Health | .089 | 3.83 | .702 |
| Work are design | -.055 | -.740 | .460 |
| Adjustable chair | -.476 | -3.631 | .000 |
| Humidity | .622 | 4.957 | .000 |
| Lighting | .736 | 5.085 | .000 |
| Acoustics | -.495 | -3.022 | .003 |
| Working hours | .188 | 1.372 | .171 |

| **Coefficient of Determination** | **Model 1** |
|---|---|
| R | 0.419 |
| R Square | 0.176 |
| Adjusted R Square | 0.157 |
| Significant value | 0.000 |
| F | 9.622 |

Dependent Variable: Stress Outcome

As can be seen from Table 4.7, the R square value is 0.419 (total variance), which means that 41.9 % of variance in occupational stress outcomes among airport staff is explained by ergonomic factors and it is significant as p value is less 0.05. The remaining 59.1 % is explained by other variables that lead to occupational stress outcomes among airport staff. In other words, the regression model sufficiently fits the data and the overall regression model is significant (Sig. F change = 0.000, R square = 0.176, p< 0.000). From the individual coefficients of the result in table 4.7,

ergonomic factors were statistically significant to occupational stress outcomes at p< 0.05. Thus hypothesis H1d, H1e, H1f and H1g were supported.

By referring to the standardized beta coefficient value, the researcher is interested to identify the most contributing factor towards occupational stress outcomes. It shows that the highest beta coefficient value and t value is lighting (β=.736, t= 5.085, sig. =.000). This indicated that lighting is the most significant variable that predicts occupational stress outcomes among airport staff in KLIA. The second highest beta coefficient value is humidity (β=.622, t= 4.957, sig. =.000) and lowest beta coefficient value is body posture (β=-0.031, t= -0. 137, sig. =.891). Thus it can be concluded that the most influencing independent variable towards occupational stress outcomes among airport staff is lighting followed by humidity, and body posture is the least influencing factor.



## 4.5 Conclusion

Based on the result, the objectives of the study have been accomplished through the three hypothesis testing. It is found that work area design and humidity is negatively correlated with occupational stress outcomes while body posture, health, adjustable chair, acoustics, lighting and working hours is positively correlated. In other words, adjustable chair, humidity, acoustics and lighting have a significant relationship with occupational stress outcomes. In the next chapter, the researcher will discuss the conclusion and recommendation for this study.

# CHAPTER FIVE

# DISCUSSIONS OF RESULTS AND CONCLUSIONS

## 5 Introduction

In this final part of the research, the researcher will elaborate the discussion based on the two research objective as presented in Chapter One. The study also gives conclusion and recommendation to respective authorities to overcome occupational stress outcomes problem among airport staff in KLIA. Besides that, the researcher also makes comparison between findings from this study and the literature from previous studies. On top of that, the researcher will also discuss the implication of the study, limitation of the study and recommendations for future research.



## 5.1 Summary of Result

The aim of this study is to identify the relationship between ergonomics factors namely body postures, health, work area design, adjustable chair, humidity, lighting, acoustic, working hours and occupational stress outcomes among the airport staff. Correspondingly, body postures, health, work area design, adjustable chair, humidity, lighting, acoustic and working hours are the independent variables for this study while occupational stress outcomes is the dependent variable which makes a total of nine variables for this research.

Therefore, two hypotheses were developed and the study attempted to achieve all the two objectives; (i) to identify the relationship between ergonomic factor namely body postures, health, work area design, adjustable chair, humidity, lighting and stress outcomes among the airport staff. (ii) to study the relationship between working

hours and occupational stress outcomes among airport staff. In the following discussion, each of the objectives is studied and comparisons with previous literature are made.

*Table 5.1 Summary of the hypotheses testing results*

| Indicator | Statement of Hypotheses | Remarks |
|---|---|---|
| H1a | There is a significant relationship between body posture and occupational stress outcomes. | **Not Supported** |
| H1b | There is a significant relationship between health and occupational stress outcomes. | **Not Supported** |
| H1c | There is a no significant relationship between work area design and occupational stress outcomes. | **Not Supported** |
| H1d | There is a no significant relationship between adjustable chair and occupational stress outcomes. | **Supported** |
| H1e | There is a significant relationship between humidity and occupational stress outcomes. | **Supported** |
| H1f | There is a significant relationship between lighting and occupational stress outcomes. | **Supported** |
| H1g | There is a significant relationship between acoustics and occupational stress outcomes. | **Supported** |
| H2 | There is a relationship between working hours and occupational stress outcomes. | **Not Supported** |

### 5.1.1 The Relationship Between Ergonomic Factors and Stress Outcomes

Results from multiple regression analysis showed that adjustable chair, humidity, followed by lighting and acoustic were statistically significant to occupational stress outcomes at $p< 0.05$. There is a significant inverse relationship between body postures, health, work area design, working hours and occupational stress outcomes, this indicates that an increase in adjustable chair, humidity, followed by lighting and acoustic will lead to a decrease of occupational stress outcomes and vice versa. It shows that in the context of KLIA, airport staff with a adjustable chair, humidity, followed by lighting and acoustic shows less stress while airport staff that have low adjustable chair, humidity, followed by lighting and acoustic indicates high stress level.

The result is consistent with finding of previous scholars (Grove, 2017) appropriate chair in the workplace allows the employee lower back to be comfortably supported and a correct back posture to be sustained. Therefore, the management support might be obtainable through the provision of control over the work environment through adjustability and knowledge may enhance worker effectiveness as well as health (Robertson and Huang, 2008). Types of management support that can be given are by providing ergonomic chair and mechanical ergonomics device designed this can prevent the effect thus can help to prevent spinal pain and reduce the occurrence of musculoskeletal Tarun *et al.,* (2017).

The researcher also observed that humidity had the most positive relationship with occupational stress outcomes at the workplace. According to (Clark, 2002) the researchers have always seen workstation environment as extreme factors, in the working environment, extreme heat in the workplace creates mental depression which affects work performance. Extreme heat and humidity often face by the airside

operation; especially those staff that handling baggage, cargo and ramp agent. Types of management support that can be given are a good indoor thermal characteristics quality such as air temperature, air movement will improve product quality and help to minimize the outcome of work stress (Design, 2017).

Airport environment on the airside operation the staff is highly exposed to direct sunlight and glare. Too much or too little light can constrain the worker‘s ability to perform their task effectively (Chandraseker, 2011). Hence, without sufficient lighting can underline the unsafe and unhealthy work environment that may affect the staff. Therefore, the management support might be obtainable through positive support and awareness to work together providing comfortable and appropriate lighting can help the staff to work in a better work environment which can lower job stress and increase their work productivity. Types of management support that can be given are by providing a comfortable workstation environment and apply high technology UV glass protection (Fairbrother and Warn, 2003).



According to Ajala (2012) noise is one of the causes of employee‘s distraction because noise reduces productivity. Consequently, it can cause serious inaccuracies, and lead to an increase in job-related stress Working in the airport is one of the occupations that expose to noise contamination especially staff that working at the airside area which the levels of 60-65 decibels (dBA) before takeoff; 80-85 dBA during flight; and 75-80 dBA during landing. Types of management support that can be given implementing noise abatement operational procedures during landing and takeoff of the aircraft. Besides that, new technologies such as the geared turbofan aircraft to reduce noise and fuel burn.

Therefore, from all the data obtained through the analysis, the researcher notices the relationship between these ergonomic variables in the workplace affected the occupational stress outcomes among the airport staff.

### 5.1.2 The Relationship Between Working Hours and Stress Outcome

The second objective of this study was to identify the relationship between working hours and occupational stress outcomes among airport staff. Multiple regression analysis also shows that working hours were statistically significant to occupational stress outcomes. The results from this study is similar to the previous studies carried out by (Iacovides et al., 2003), who stated that long working hours could cause acute stress in the workplace and extreme fatigue led to stress. Commonly, the airline industry is operating 24 hours daily. Thus most workers required to work in shift schedules, which can cause insufficient rest, disturb sleep rhythm and would experience insomnia. The management implements a balance working time structures between work and sleep which can decrease the stress level and less contribute to an accident (Tzischinsky, 2018). In addition, management can provide a clear directive on work timing and increase the duration of rest periods of the staff this may preserving and improving worker‘s health and wellbeing (International Labour Organization (ILO).

## 5.2 The Implication of the Study

The finding of this study will provide clarity on the factors that causes occupational stress outcomes among airport staff in aviation industry. The finding of this study will probably be beneficial to Human Resource Manager, Operations Manager and the Training & Development Manager. The management in KLIA can work together to reduce the stress level among airport staff since it was proven that the respondents have moderate occupational stress outcomes. The managers should look into ways to reduce the occupational stress outcomes among airport staff because stress lead to consequences such as occupation hazard, high turnover and health claims. Thus, conduct an awareness program for the staff that related to ergonomic awareness program training and manual handling practicing at the airport to create awareness among the staff to practice the work conduct, at the same time to create a measurement to control the risk occurrence and hazard within the airport environment. Accordance with the ministry of occupational safety and health Malaysia, which opted to protect each employee's rights and interests on the safety, health, and environment at the workplace.

The management can encourage airport staff by practically conduct a yearly medical check-up to screen the employee capability of work. The management should also provide scheduled team building for the airport staff. Team building will create excitement among employees and they will feel connected to their company. On top of that, encourage the employees by practicing an active and healthy lifestyle; this control measure can create a conducive work environment to increase the employee's productivity.

## 5.3 Recommendation

This research examined three independent variables which are proven to have correlation with occupational stress outcomes among airport staff in Kuala Lumpur International Aiport in Sepang. Thus, it is suggested that future scholars should conduct research on the same study and cover other international or domestic airports in the other state of Malaysia. Besides that future researchers should conduct research on other variables that could possibly lead to occupational stress among airport staff. In addition, data collection period should be extended so that more employees could participate in the study. On top of that, future scholars can do in-depth interviews in order to understand better the factors that contribute to stress among employees.

The researcher has outlined the following recommendations to reduce the ergonomic factors that lead to occupational stress among airport staff;

(i) The management should encourage staff to take a break from their work station, by providing a place to relax and to distress in office. Management should discuss with employees whether the chair design is comfortable enough or should be replaced.

(ii) Conduct an evaluation on the work environment and discuss the conditions that need to be improved. Employee health should be evaluated and employee input should be obtained.

## 5.4 Conclusion

In conclusion, the result of this study indicated that there is a positive correlation between adjustable chair, humidity, acoustic, lighting and occupational stress outcomes while body postures, health, work area design and working hours has a significant inverse relationship with occupational stress outcomes. Thus all the two hypotheses are accepted. Furthermore findings from this study also showed that the respondents were experiencing moderate occupational stress outcomes.

In a developing country such as Malaysia, ergonomics helps to improve productivity and enhance workplace Occupational Safety and Health (OSH). Therefore, it is importance to promote ergonomics concepts and practice to other various industries so that it can help to improve workplace conditions as well as enhancing employee health and well-being.

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**APPENDIX A**

Dear Respondents,

I am a Master Science student at University Utara Malaysia (UUM). As part of this course, I am required to undertake a research project on the Ergonomic factor impact on stress among Airport employees specifically with the Airline sector to fulfill the Master requirement of the university.

I understand recognize that your time is valuable and many demands are made upon it by your heavy workload. However, your participation in this survey, which will require only about 10-15 minutes of your time, is vital to the success of this study.

Please be assured that all your responses will be strictly for academic purposes only. Should you have any queries regarding this research please do not hesitate to contact me at dnately@gmail.com. Thank you very much for your cooperation in responding to the questionnaire. Your participation in this study is greatly appreciated.

Sincerely,

Dynatalie Delicious

MSc Candidate

## RESEARCH QUESTIONNAIRES

**Instructions: The Survey Question below is divided into a total of seven sections (Section A to G). Please help me to answer the survey below by filling out in the GOOGLE FORM. Thank you.**

**Bahagian A: Maklumat Demografi**
***Section A: Demographic Information***

**Sila tanda (√) pada ruangan yang sesuai atau isi pada tempat kosong, yang mana bersesuaian.**
***Please check (√) in the appropriate box or fill in the blank, where appropriate.***

1. Jantina anda ( *Your gender*):
   □ Lelaki (*Male*)
   □ Perempuan (*Female*)

2. Taraf perkahwinan anda ( *Your marital status*):
   □ Bujang (*Single*)
   □ Berkahwin (*Married*)
   □ Janda/duda/bercerai (*Divorced/windowed*)

3. Tahap pendidikan tertinggi anda ( *Your highest educational level*):
   □ MCE/SPM/SPMV
   □ Diploma
   □ Sarjana Muda (*Bachelor degree*)
   □ Ijazah Sarjana (*Master's Degree*)
   □ Doktor falsafah (*PhD / Doctorate*)
   □ Lain-lain, sila nyatakan (*Others, please specify*):_____

4. Bangsa (*Race*):
   □ Melayu (*Malay*)
   □ Cina (*Chinese*)
   □ India (*Indian*)
   □ Lain-lain, sila nyatakan (*Others, please specify*):_____

5. Umur anda ( *Your age*):
   □ <25 Tahun (< 25 *years old*)
   □ 26-30 Tahun (26 – 30 *years old*)
   □ 31-35 Tahun (31 – 35 *years old*)
   □ 36-40 Tahun (36 – 40 *years old*)
   □ 41-45 Tahun (41 – 45 *years old*)
   □ >46 Tahun (46 > *years old*)

6. Sudah berapa lama anda berkhidmat dengan syarikat yang anda berkerja sekarang?
(*How long have you been working with current company?*)
_____tahun (*years*)
7. Adakah purata gaji bulanan anda? (*What is your Gross Salary Income?*)
□ RM1,500 – RM3,000
□ RM3,001 – RM4,500
□ RM4,501 – RM6,000
□ RM6,001 – RM7,500
□ RM7,501 – RM10,000
□ >RM10,000

8. Jumlah jam berkerja dalam seminggu? (*Total of working hour per week*)
□ 40-48 Jam (hours)
□ 46-55 Jam (hours)
□ 56-65 Jam (hours)
□ 76-85 Jam (hours)

*9.* Dimanakah anatara berikut merupakan perkerjaan di syarikat penerbangan?
*(Which of the following best describe your role in Airline industry?)*

□ Juruterbang (Captain and First Officer)
□ Pramugara / Pramugari (Flight attendants)
□ Jurutera Penerbangan (Flight Engineer)
□ Pengawal trafik udara (Air traffic controller)
□ Egen Pengendali / Bagasi dan kargo (Ramp Agents / Baggage and cargo handler)
□ Ejen tiket / krew (Ticket agents / Crew schedulers Coordinator)

# SOAL SELIDIK ERGONOMIK DI TEMPAT KERJA
# (SURVEY OF ERGONOMIC WORKPLACE SAFETY)

**Bahagian B: Faktor Postur Badan**
**Section B: Body Postures Factor**

Fikirkan tentang kedudukan postur badan anda semasa mejalankan kerja. Sejauh mana anda bersetuju atau tidak bersetuju dengan setiap kenyataan di bawah yang menggambarkan majikan anda sekarang? **Bulatkan** jawapan anda berpandukan skala di atas.

(Think about your body postures aspects during working. To what extent you agree or disagree whether each statement below describe your current employer? **Circle** your answer using the scale below).

| **Sangat tidak setuju (strongly disagree)** | **Tidak setuju (Disagree)** | **Berkecuali (Neither agree nor disagree)** | **Setuju (Agree)** | **Sangat setuju (strongly agree)** |
|---|---|---|---|---|
| **1** | 2 | 3 | 4 | 5 |



| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | Perkerjaan saya memerlukkan saya untuk berdiri lama dari kerusi kerja<br>*(My job needs me to frequently stand up from my working chair.)* | 1 | 2 | 3 | 4 | 5 |
| 2 | Perkerjaan saya memerlukkan saya untuk sentiasa mengangkat barang berat.<br>*(My job needs me to frequently carry heavy objects.)* | 1 | 2 | 3 | 4 | 5 |
| 3 | *Perkerjaan saya memerlukan saya untuk berdiri dalam masa yang lama.*<br>*My job needs me to stand for long periods.* | 1 | 2 | 3 | 4 | 5 |
| 4 | Saya melakukkan pergerakkan berulang untuk jangka masa yang lama.<br>*I do repetitive movements for long periods of time.* | 1 | 2 | 3 | 4 | 5 |
| 5 | Saya berkerja dalam keadaan postur badan yang tidak selesa.<br>*I work in an uncomfortable posture.* | 1 | 2 | 3 | 4 | 5 |
| 6 | Saya melakukan kerja pergerakkan berulang dan kerap menggunnkan bahagaian tangan, lengan dan jari. | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | *I do repetitive tasks and frequently use my arm, hand, or fingers.* | | | | | |
| 7 | *Pekerjaan saya membuatkan saya keletihan fizikal.*<br>*My job makes me physically exhausted at the end of the day.* | 1 | 2 | 3 | 4 | 5 |
| 8 | Saya sentiasa cuba untuk melakukan tugas saya di stesen kerja saya.<br>*I always hunch to do my tasks at my workstation.* | 1 | 2 | 3 | 4 | 5 |
| 9 | Susunan kerja saya dan tempat duduk di stesen kerja saya sesak.<br>*The arrangement at my work and the seat at my workstation are congested* | | | | | |

**Bahagian C: Faktor kesihatan.**
**Section C: Health factor.**

Fikirkan tentang keadaan kesihatan anda di tempat kerja. Sejauh mana anda bersetuju atau tidak bersetuju dengan setiap kenyataan di bawah yang menggambarkan majikan anda sekarang? **Bulatkan** jawapan anda berpandukan skala di atas.

(Think about your health aspects in workplace. To what extent you agree or disagree whether each statement below describe your current employer? **Circle** your answer using the scale below).

| **Sangat tidak setuju (strongly disagree)** | **Tidak setuju (Disagree)** | **Berkecuali (Neither agree nor disagree)** | **Setuju (Agree)** | **Sangat setuju (strongly agree)** |
|---|---|---|---|---|
| **1** | 2 | 3 | 4 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | Saya telah mengambil cuti sakit kerana tekanan.<br>*I have taken sick days because of stress.* | 1 | 2 | 3 | 4 | 5 |
| 2 | Saya mengalami tidur yang tidak lena atau tabiat tidur yang tidak teratur kerana masalah yang berkaitan dengan kerja.<br>*I experienced sleeplessness/irregular sleep habits due to problems related to work.* | 1 | 2 | 3 | 4 | 5 |
| 3 | Saya rasa tertekan dengan kerja saya sekarang.<br>*I feel tensed with my current job.* | 1 | 2 | 3 | 4 | 5 |
| 4 | Saya mempunyai masalah tidur disebabkan oleh kekejangan/sakit pada otot atau sendi saya.<br>*I have trouble sleeping due to stiffness/aching at my muscles or joints.* | 1 | 2 | 3 | 4 | 5 |
| 5 | Saya mempunyai tahap kesihatan yang tidak memuaskan.<br>*I have an unsatisfactory health level.* | 1 | 2 | 3 | 4 | 5 |

**Bahagian D : Kerusi bekerja.**
**Section D : Working chair**

Fikirkan tentang keadaan kerusi semasa anda semasa berkerja dan reka cipta di persekitaran tempat kerja anda. Sejauh mana anda bersetuju atau tidak bersetuju dengan setiap kenyataan di bawah yang menggambarkan majikan anda sekarang? **Bulatkan** jawapan anda berpandukan skala di atas.

(Think about your working chair aspects within workplace. To what extent you agree or disagree whether each statement below describe your current employer? **Circle** your answer using the scale below).

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | Saya boleh melaraskan kerusi kerja saya dengan mudah.<br>*I can adjust my work chair easily.* | 1 | 2 | 3 | 4 | 5 |
| 2 | *Kerusi kerja saya boleh laras ke pelbagai posisi.*<br>*My working chair is adjustable into various positions*. | 1 | 2 | 3 | 4 | 5 |
| 3 | Kerusi kerja saya boleh laras.<br>*My working chair is adjustable.* | 1 | 2 | 3 | 4 | 5 |

**Bahagian E : Faktor reka cipta di persekitaran tempat kerja.**
**Section E : Work area design**

Fikirkan tentang keadaan reka cipta di persekitaran tempat kerja anda. Sejauh mana anda bersetuju atau tidak bersetuju dengan setiap kenyataan di bawah yang menggambarkan majikan anda sekarang? **Bulatkan** jawapan anda berpandukan skala di atas.

(Think about your work area design aspects within workplace. To what extent you agree or disagree whether each statement below describe your current employer? **Circle** your answer using the scale below).

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | Stesen kerja saya menyediakan saya dengan kawasan kerja yang selesa.<br>*My workstation provides me with a comfortable working area.* | 1 | 2 | 3 | 4 | 5 |
| 2 | Persekitaran kawasan kerja saya adalah memuaskan.<br>*My work area's environment is acceptable.* | 1 | 2 | 3 | 4 | 5 |

**Bahagian F : Kelembapan**
**Section F : Humidity**

Fikirkan tentang keadaan kelembapan di tempat kerja. Sejauh mana anda bersetuju atau tidak bersetuju dengan setiap kenyataan di bawah yang menggambarkan majikan anda sekarang? **Bulatkan** jawapan anda berpandukan skala di atas.

(Think about humidity aspects within workplace. To what extent you agree or disagree whether each statement below describe your current employer? **Circle** your answer using the scale below).

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | Suhu di ruang kerja saya adalah terlalu panas.<br>*My work space's internal temperature is too hot.* | 1 | 2 | 3 | 4 | 5 |
| 2 | Terdapat pengudaraan minimum kawasan kerja saya.<br>*There is minimal ventilation at my work area.* | 1 | 2 | 3 | 4 | 5 |
| 3 | Udara kawasan kerja saya adalah terlalu kering.<br>*My work area's air is too dry.* | 1 | 2 | 3 | 4 | 5 |
| 4 | Terdapat bau busuk di ruang kerja saya.<br>*Unpleasant odours are present at my work area.* | 1 | 2 | 3 | 4 | 5 |
| 5 | Udara kawasan kerja saya adalah terlalu lapuk.<br>*My work area's air is too stale.* | 1 | 2 | 3 | 4 | 5 |



**Bahagian G : Faktor akustik di tempat kerja**
**Section G : Acoustics Aspects**

Fikirkan tentang tahap bunyi di persekitaran tempat kerja. Sejauh mana anda bersetuju atau tidak bersetuju dengan setiap kenyataan di bawah yang menggambarkan majikan anda sekarang? **Bulatkan** jawapan anda berpandukan skala di atas.

(Think about noise level within workplace. To what extent you agree or disagree whether each statement below describe your current employer? **Circle** your answer using the scale below).

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | Tahap bunyi bising di kawasan kerja saya adalah dalam lingkungan had biasa.<br>*The noise level in my work area is within normal limits.* | 1 | 2 | 3 | 4 | 5 |
| 2 | Persekitaran di ruang kerja tidak mempunyai masalah bunyi bising.<br>*The workstation's environment has no noise problem.* | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 3 | Tindakan sewajarnya terus diambil untuk mengurangkan tahap bunyi bising di kawasan stesen kerja saya.<br>*Efforts are continuously made to minimize the noise level in my workstation area.* | 1 | 2 | 3 | 4 | 5 |

**Bahagian H : Pencahayaan**
**Section H : Lighting**

Fikirkan tentang keadaan pencahayaan di tempat kerja. Sejauh mana anda bersetuju atau tidak bersetuju dengan setiap kenyataan di bawah yang menggambarkan majikan anda sekarang? **Bulatkan** jawapan anda berpandukan skala di atas.

(Think about lighting aspects within workplace. To what extent you agree or disagree whether each statement below describe your current employer? **Circle** your answer using the scale below).

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | Lampu di ruang kerja saya adalah memuaskan.<br>*The lighting at my work area is satisfactory.* | 1 | 2 | 3 | 4 | 5 |
| 2 | Mempunyai sistem pencahayaan yang fleksibel di kawasan kerja saya.<br>*A flexible lighting system exists at my work area.* | 1 | 2 | 3 | 4 | 5 |
| 3 | Lampu yang terang meningkatkan prestasi kerja saya.<br>*The bright lighting increases my job performance.* | 1 | 2 | 3 | 4 | 5 |
| 4 | Pencahayaan yang mencukupi dibekalkan ketika saya melakukan tugas saya.<br>*Adequate lighting is supplied when I am doing my tasks.* | 1 | 2 | 3 | 4 | 5 |

**Bahagian I : Waktu berkerja**
**Section I : Working Hours**

Fikirkan tentang tempoh masa berkerja anda. Sejauh mana anda bersetuju atau tidak bersetuju dengan setiap kenyataan di bawah yang menggambarkan majikan anda sekarang? **Bulatkan** jawapan anda berpandukan skala di atas.

(Think about working hours aspects within workplace. To what extent you agree or disagree whether each statement below describe your current employer? **Circle** your answer using the scale below).

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | Saya merasa berpuas hati dengan waktu bekerja yang ditetapkan oleh organisasi.<br>*I feel satisfied with the working hours fixed by the organization.* | 1 | 2 | 3 | 4 | 5 |
| 2 | Saya diberi tempoh rehat yang mencukupi semasa bekerja.<br>*I am given sufficient rest periods within my working day.* | 1 | 2 | 3 | 4 | 5 |
| 3 | Waktu kerja yang tetap tidak menjejaskan kehidupan peribadi saya.<br>*The fixed working hour does not affect my personal life.* | 1 | 2 | 3 | 4 | 5 |



**Bahagian J: Faktor Stres di tempat kerja**
**Section J: Factors stress at workstation**

Fikirkan tentang tahap stres anda semasa mejalankan kerja. Sejauh mana anda bersetuju atau tidak bersetuju dengan setiap kenyataan di bawah yang menggambarkan majikan anda sekarang? **Bulatkan** jawapan anda berpandukan skala di atas.

(Think about your Stress aspects during working. To what extent you agree or disagree whether each statement below describe your current employer? **Circle** your answer using the scale below).

| **Sangat tidak setuju (strongly disagree)** | **Tidak setuju (Disagree)** | **Berkecuali (Neither agree nor disagree)** | **Setuju (Agree)** | **Sangat setuju (strongly agree)** |
|---|---|---|---|---|
| **1** | 2 | 3 | 4 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | Kadang-kadang saya rasa kelesuan.<br>*Sometimes I feel burned out.* | 1 | 2 | 3 | 4 | 5 |
| 2 | Saya mudah rasa marah / jengkel dengan persekitaran stesen kerja saya.<br>*I easily feel annoyed / irritated with my workstation environment.* | 1 | 2 | 3 | 4 | 5 |
| 3 | Masalah di tempat kerja menyebabkan saya mengalami ketidakselesaan pada perut.<br>*Work problems cause me to have abdominal discomfort.* | 1 | 2 | 3 | 4 | 5 |
| 4 | Masalah kerja membuat hati saya berdenyut lebih cepat daripada biasa.<br>*Work problems make my heart beat faster than usual.* | 1 | 2 | 3 | 4 | 5 |
| 5 | Saya kehilangan selera makan kerana masalah kerja.<br>*I lose my appetite due to work problems.* | 1 | 2 | 3 | 4 | 5 |
| 6 | Saya mudah penat dengan kerja.<br>*I easily get tired of work.* | 1 | 2 | 3 | 4 | 5 |
| 7 | Saya merasa demotivasi untuk menyelesaikan tugasan yang diberikan.<br>*I feel demotivated to complete given tasks.* | 1 | 2 | 3 | 4 | 5 |
| 8 | Keletihan kerana kerja-kerja membuat saya murung dan tidak menggalakkan saya daripada melakukan kerja.<br>*Tiredness due to work makes me depressed and discourages me from doing work.* | 1 | 2 | 3 | 4 | 5 |



**Bahagian K: Kepuasan berkerja**
**Section K: Job dissatisfaction**

Fikirkan tentang kepuasan berkerja dalam pekerjaan anda. Sejauh mana anda bersetuju atau tidak bersetuju dengan setiap kenyataan di bawah yang menggambarkan majikan anda sekarang? **Bulatkan** jawapan anda berpandukan skala di atas.

(Think about your job satisfaction aspects of your job during working. To what extent you agree or disagree whether each statement below describe your current employer? **Circle** your answer using the scale below).

| | **Ketidakpuasan kerja / Job dissatisfaction** | | | | | |
|---|---|---|---|---|---|---|
| 1 | Apabila memikirkan tentang kerja, saya berasa letih dan marah.<br>*When thinking about work, I feel tired and* | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | *temperamental.* | | | | | |
| 2 | Saya tidak berpuas hati dengan pekerjaan terkini saya.<br>*I am not satisfied with my current job.* | 1 | 2 | 3 | 4 | 5 |
| 3 | Umumnya, saya tidak menyukai pekerjaan saya sekarang.<br>*Generally, I dislike my current job.* | 1 | 2 | 3 | 4 | 5 |
| 4 | Pekerjaan saya sentiasa berulang-ulang dan membosankan.<br>*My jobs are repetitive and boring.* | 1 | 2 | 3 | 4 | 5 |

**Bahagian L: Niat untuk berhenti**
**Section L: Intention to quit**

Fikirkan tentang niat anda untuk berhenti untuk berkerja. Sejauh mana anda bersetuju atau tidak bersetuju dengan setiap kenyataan di bawah yang menggambarkan majikan anda sekarang? **Bulatkan** jawapan anda berpandukan skala di atas.

(Think about your intemtion to quitting your job. To what extent you agree or disagree whether each statement below describe your current employer? **Circle** your answer using the scale below).



| | **Niat untuk berhenti / Intention to quit** | | | | | |
|---|---|---|---|---|---|---|
| 1 | Saya suka bekerja dengan organisasi ini.<br>*I like to work for this organization.* | 1 | 2 | 3 | 4 | 5 |
| 2 | Saya akan terus berusaha untuk pembangunan organisasi.<br>*I will strive for the organization's development.* | 1 | 2 | 3 | 4 | 5 |
| 3 | Saya berasa bangga untuk bekerja dalam organisasi ini.<br>*I am proud to work in this organization.* | 1 | 2 | 3 | 4 | 5 |
| 4 | Saya akan memberitahu kawan-kawan saya bahawa organisasi ini adalah tempat yang baik untuk bekerja di.<br>*I will tell my friends that this organization is a good place to work in.* | 1 | 2 | 3 | 4 | 5 |
| 5 | Saya mengambil berat tentang nasib ini organisasi.<br>*I care so much about this organization's fate.* | 1 | 2 | 3 | 4 | 5 |
| 6 | Saya tidak pernah terfikir untuk berhenti dan menyertai syarikat-syarikat lain.<br>*I have never thought about quitting and join other companies*. | 1 | 2 | 3 | 4 | 5 |

# APPENDIX B

# SPSS Output

# NORMALITY ANALYSIS

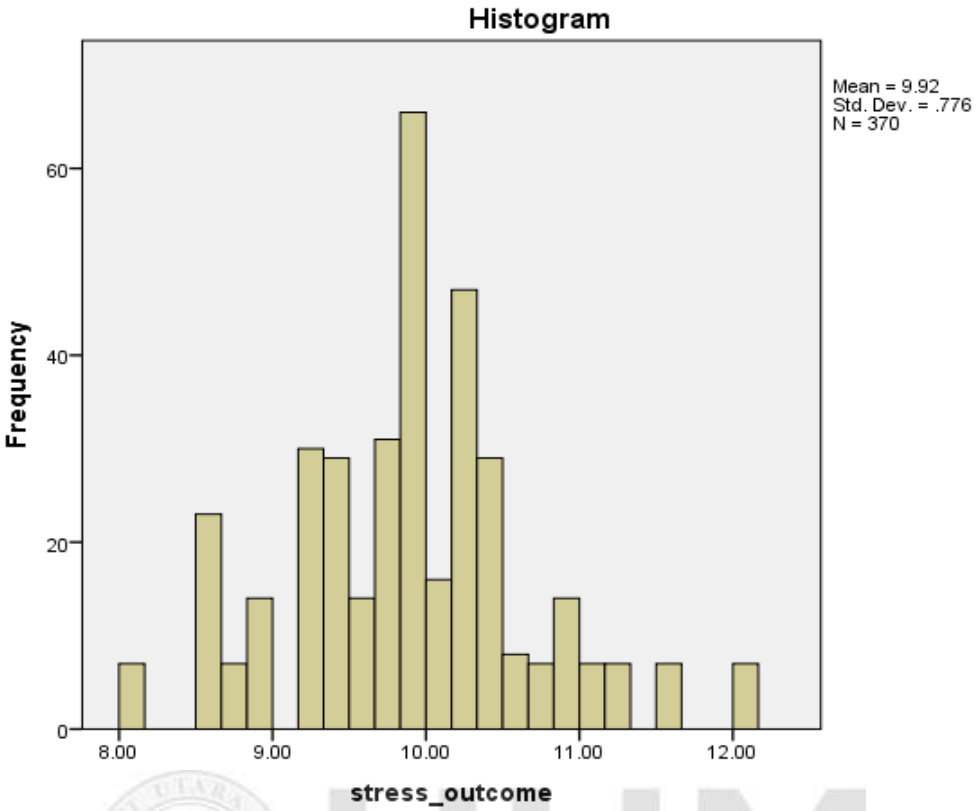
**Descriptive**

| | | | Statistic | Std. Error |
|---|---|---|---|---|
| stress_outcome | Mean | | 9.9155 | .04033 |
| | 95% Confidence Interval for Mean | Lower Bound | 9.8362 | |
| | | Upper Bound | 9.9949 | |
| | 5% Trimmed Mean | | 9.8989 | |
| | Median | | 9.9167 | |
| | Variance | | .602 | |
| | Std. Deviation | | .77581 | |
| | Minimum | | 8.08 | |
| | Maximum | | 12.17 | |
| | Range | | 4.08 | |
| | Interquartile Range | | .83 | |
| | Skewness | | .256 | .127 |
| | Kurtosis | | .617 | .253 |
| ergonomic | Mean | | 23.6485 | .14788 |
| | 95% Confidence Interval for Mean | Lower Bound | 23.3577 | |
| | | Upper Bound | 23.9393 | |
| | 5% Trimmed Mean | | 23.6724 | |
| | Median | | 23.8778 | |
| | Variance | | 8.092 | |
| | Std. Deviation | | 2.84458 | |
| | Minimum | | 17.77 | |
| | Maximum | | 29.02 | |
| | Range | | 11.25 | |
| | Interquartile Range | | 3.63 | |
| | Skewness | | -.204 | .127 |
| | Kurtosis | | -.730 | .253 |

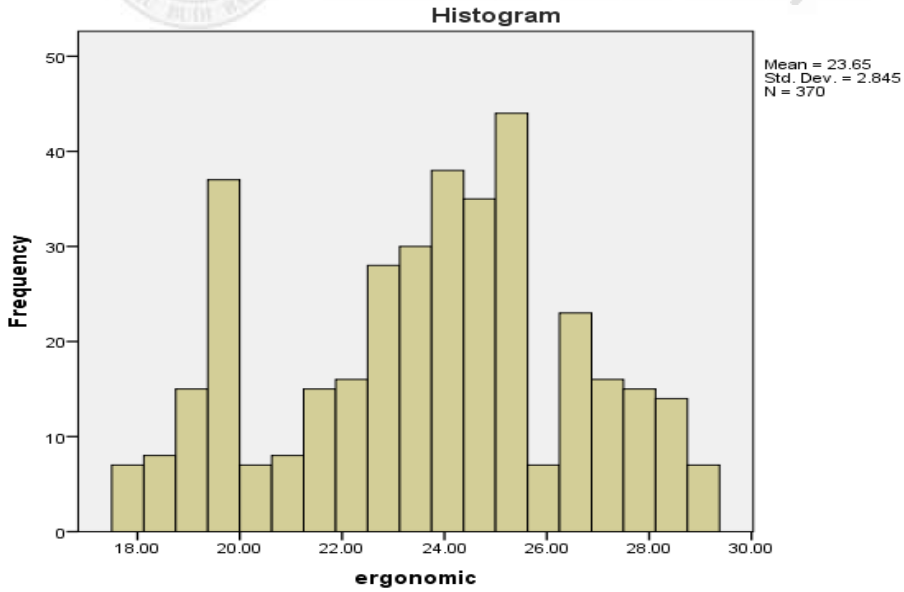
a. Lilliefors Significance Correction

**Tests of Normality**

| | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
| | Statistic | df | Sig. | Statistic | df | Sig. |
| stress_outcome | .086 | 370 | .000 | .976 | 370 | .000 |
| ergonomic | .085 | 370 | .000 | .970 | 370 | .000 |





# MULTI COLLINEARILITY

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .419[a] | .176 | .157 | .71210 |

a. Predictors: (Constant), Workinghours, Workareadesign, Humidity, Lighting, Workingchair, Acoustics, Bodyposture, Healthfactor

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 39.035 | 8 | 4.879 | 9.622 | .000[b] |
| | Residual | 183.058 | 361 | .507 | | |
| | Total | 222.093 | 369 | | | |

a. Dependent Variable: stress_outcome

b. Predictors: (Constant), Workinghours, Workareadesign, Humidity, Lighting, Workingchair, Acoustics, Bodyposture, Healthfactor

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | Collinearity Statistics | |
|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | Tolerance | VIF |
| 1 | (Constant) | 7.770 | .402 | | 19.332 | .000 | | |
| | Bodyposture | .031 | .229 | .022 | .137 | .891 | .087 | 11.461 |
| | Healthfactor | .089 | .233 | .063 | .383 | .702 | .085 | 11.813 |
| | Workingchair | -.476 | .131 | -.345 | -3.631 | .000 | .253 | 3.953 |
| | Workareadesign | -.055 | .075 | -.041 | -.740 | .460 | .745 | 1.343 |
| | Humidity | .622 | .126 | .320 | 4.957 | .000 | .548 | 1.826 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Acoustics | -.495 | .164 | -.311 | -3.022 | .003 | .215 | 4.645 |
| Lighting | .736 | .145 | .448 | 5.085 | .000 | .294 | 3.396 |
| Workinghours | .188 | .137 | .122 | 1.372 | .171 | .289 | 3.466 |

a. Dependent Variable: stress_outcome

## REALIBILITY ANALYSIS

**Reliability Statistics**

| Cronbach's Alpha | N of Items |
|---|---|
| .835 | 11 |

**Item-Total Statistics**

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Cronbach's Alpha if Item Deleted |
|---|---|---|---|---|
| Bodyposture | 33.4799 | 8.986 | .843 | .789 |
| Healthfactor | 33.5786 | 8.870 | .884 | .784 |
| Workingchair | 33.5153 | 9.083 | .782 | .794 |
| Workareadesign | 33.7451 | 10.783 | .247 | .846 |
| Humidity | 33.8402 | 10.427 | .568 | .818 |
| Acoustics | 33.6027 | 9.369 | .817 | .795 |
| Lighting | 33.3944 | 9.539 | .785 | .798 |
| Workinghours | 33.5640 | 9.350 | .793 | .796 |
| somatic_Stress | 33.6201 | 10.768 | .521 | .823 |
| Jobsatisfaction | 33.8410 | 12.807 | -.274 | .883 |
| Qutting | 33.5397 | 11.368 | .070 | .865 |

# MULTIPLE REGRESSIONS

**Model Summary[b]**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .419[a] | .176 | .157 | .71210 |

a. Predictors: (Constant), Workinghours, Workareadesign, Humidity, Lighting, Workingchair, Acoustics, Bodyposture, Healthfactor

b. Dependent Variable: stress_outcome

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 39.035 | 8 | 4.879 | 9.622 | .000[b] |
| | Residual | 183.058 | 361 | .507 | | |
| | Total | 222.093 | 369 | | | |

a. Dependent Variable: stress_outcome

b. Predictors: (Constant), Workinghours, Workareadesign, Humidity, Lighting, Workingchair, Acoustics, Bodyposture, Healthfactor



**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 7.770 | .402 | | 19.332 | .000 |
| | Bodyposture | .031 | .229 | .022 | .137 | .891 |
| | Healthfactor | .089 | .233 | .063 | .383 | .702 |
| | Workingchair | -.476 | .131 | -.345 | -3.631 | .000 |
| | Workareadesign | -.055 | .075 | -.041 | -.740 | .460 |
| | Humidity | .622 | .126 | .320 | 4.957 | .000 |
| | Acoustics | -.495 | .164 | -.311 | -3.022 | .003 |
| | Lighting | .736 | .145 | .448 | 5.085 | .000 |
| | Workinghours | .188 | .137 | .122 | 1.372 | .171 |

a. Dependent Variable: stress_outcome

## MEAN AND STANDARD DEVIATION

**Statistics**

| | | Body posture | Health factor | Working chair | Work area design | Humidity | Acoustics | Lighting | Working hours |
|---|---|---|---|---|---|---|---|---|---|
| N | Valid | 370 | 370 | 370 | 370 | 370 | 370 | 370 | 370 |
| | Missing | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mean | | 3.4922 | 3.3935 | 3.4568 | 3.2270 | 3.1319 | 3.3694 | 3.5777 | 3.4081 |
| Median | | 3.4444 | 3.4000 | 3.3333 | 3.0000 | 3.1000 | 3.3333 | 3.6250 | 3.5000 |
| Mode | | 3.44 | 3.40 | 3.67 | 3.00 | 3.20 | 3.33 | 3.75 | 3.67 |
| Std. Deviation | | .54723 | .54714 | .56236 | .57601 | .39906 | .48825 | .47199 | .50424 |

# PEARSON CORRELATION

**Correlations**

| | | stress_outcome | Bodyposture | Healthfactor | Workingchair | Workareadesign | Humidity | Acoustics | Lighting | Workinghours |
|---|---|---|---|---|---|---|---|---|---|---|
| stress_outcome | Pearson Correlation | 1 | .145** | .160** | .027 | -.034 | .281** | .104* | .207** | .166** |
| | Sig. (2-tailed) | | .005 | .002 | .606 | .517 | .000 | .045 | .000 | .001 |
| | N | 370 | 370 | 370 | 370 | 370 | 370 | 370 | 370 | 370 |
| Bodyposture | Pearson Correlation | .145** | 1 | .940** | .826** | .179** | .629** | .756** | .653** | .799** |
| | Sig. (2-tailed) | .005 | | .000 | .000 | .001 | .000 | .000 | .000 | .000 |
| | N | 370 | 370 | 370 | 370 | 370 | 370 | 370 | 370 | 370 |
| Healthfactor | Pearson Correlation | .160** | .940** | 1 | .819** | .254** | .625** | .812** | .726** | .790** |
| | Sig. (2-tailed) | .002 | .000 | | .000 | .000 | .000 | .000 | .000 | .000 |
| | N | 370 | 370 | 370 | 370 | 370 | 370 | 370 | 370 | 370 |
| Workingchair | Pearson Correlation | .027 | .826** | .819** | 1 | .332** | .477** | .754** | .694** | .711** |
| | Sig. (2-tailed) | .606 | .000 | .000 | | .000 | .000 | .000 | .000 | .000 |
| | N | 370 | 370 | 370 | 370 | 370 | 370 | 370 | 370 | 370 |
| Workareadesign | Pearson Correlation | -.034 | .179** | .254** | .332** | 1 | -.046 | .282** | .398** | .210** |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Sig. (2-tailed) | .517 | .001 | .000 | .000 | | .380 | .000 | .000 | .000 |
| | N | 370 | 370 | 370 | 370 | 370 | 370 | 370 | 370 | 370 |
| Humidity | Pearson Correlation | .281** | .629** | .625** | .477** | -.046 | 1 | .516** | .377** | .509** |
| | Sig. (2-tailed) | .000 | .000 | .000 | .000 | .380 | | .000 | .000 | .000 |
| | N | 370 | 370 | 370 | 370 | 370 | 370 | 370 | 370 | 370 |
| Acoustics | Pearson Correlation | .104* | .756** | .812** | .754** | .282** | .516** | 1 | .803** | .773** |
| | Sig. (2-tailed) | .045 | .000 | .000 | .000 | .000 | .000 | | .000 | .000 |
| | N | 370 | 370 | 370 | 370 | 370 | 370 | 370 | 370 | 370 |
| Lighting | Pearson Correlation | .207** | .653** | .726** | .694** | .398** | .377** | .803** | 1 | .687** |
| | Sig. (2-tailed) | .000 | .000 | .000 | .000 | .000 | .000 | .000 | | .000 |
| | N | 370 | 370 | 370 | 370 | 370 | 370 | 370 | 370 | 370 |
| Workinghours | Pearson Correlation | .166** | .799** | .790** | .711** | .210** | .509** | .773** | .687** | 1 |
| | Sig. (2-tailed) | .001 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | |
| | N | 370 | 370 | 370 | 370 | 370 | 370 | 370 | 370 | 370 |

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

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